DOCUMENT RESUME

ED 242 910 CE 038 695

TITLE Plumbing Curriculum Guide. Construction Trades. Michigan Trade and Industrial Education.
INSTITUTION Michigan State Univ., East Lansing. Coll. of Agriculture and Natural Resources Education Inst.
SPONS AGENCY Michigan State Dept. of Education, Lansing. Vocational-Technical Education Service.
PUB DATE [84]
NOTE 163p.; For related documents, see CE 038 686-696.
AVAILABLE FROM Michigan Vocational Education Resources Center, 133 Erickson Hall, Michigan State University, East Lansing, MI 48824.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC07 Plus Postage.
DESCRIPTORS *Building Trades; Competency Based Education; Construction (Process); Curriculum Guides; *Employment Potential; Job Analysis; *Job Skills; *Occupational Information; *Plumbing; Secondary Education; Student Evaluation; Task Analysis; *Trade and Industrial Education

ABSTRACT

This task-based curriculum guide is intended to help secondary teachers provide relevant training for an entry-level job in plumbing. Introductory materials include background information on trade and industrial education and program goals and safety information. Descriptions follow of the construction trades program, vocational cooperative education, work experience/unpaid work experience, work experience and career exploration programs, and vocational work study. This job information is then provided: job titles and a task inventory for plumbing. Tasks are grouped under these eight duties: performing general plumbing activities, joining pipes, installing waste lines, building drains, installing water lines, setting fixtures, performing special features, and using employability skills. Duty tabs comprise the largest portion of the curriculum guide. Each task in the listing is presented in a one-page format that provides this information: duty, task, achievement indicators, criteria, tools and equipment, and resources. Other components of the curriculum guide include a student achievement record, a class achievement record, and a glossary of vocational terms. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED242910

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

D Kielbaso

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

MICHIGAN TRADE & INDUSTRIAL EDUCATION
CURRICULUM GUIDE

TABLE OF CONTENTS

1. Introduction

   a. Program Definition/Goals
   b. Goals of Vocational Technical Education
   c. Trade and Industrial Education
   d. Trade and Industrial Education Student Organization V.I.C.A.
   e. Trade and Industrial Education Curriculum Guide
   f. Acknowledgements

2. Safety Information

   a. Eye Protection Law
   b. National Standard School Shop Safety Inspection Checklist

3. T&I Course Components

   a. C.I.P. Program Description
   b. Is Yours A Balanced Program (Chart)
   c. Vocational Cooperative Education
   d. Work Experience/Unpaid Work Experience
   e. Work Experience and Career Exploration Program
   f. Vocational Work Study

4. Job Information

   a. Job Titles
   b. Duty/Task - Job Matrix

5. Composite Task List

6. Duty Tabs (Tasks) A-Z
   NOTE: Last Duty Tab is Employability Skills

7. Tool & Equipment List

8. Special Needs Information

9. Student Achievement

   a. Student Achievement Record
   b. Class Achievement Record

10. Glossary of Vocational Terms

11. References and Resources

INTRODUCTION

The Michigan Department of Education, Vocational-Technical Education Service, has adopted descriptions and codes for vocational-technical education programs found in the document entitled, "A Classification of Instructional Programs" (C.I.P.) National Center for Educational Statistics, February, 1981. This new coding system is required of all states in reporting data on all programs receiving funds under P.L. 94-482, the Vocational Education Amendments of 1976.

The current United States Office of Education (U.S.O.E.) coding system was discontinued at the conclusion of the 1981-82 school year. The 1982-83 school year is a transition year from the U.S.O.E. code system to the new C.I.P. Code system.

This Michigan Trade and Industrial Education Curriculum Guide uses the new C.I.P. program description code(s) and lists the entry level job titles associated with the occupational program area by the Dictionary of Occupational Titles (Fourth Edition, 1977), D.O.T. Code, and the Michigan Occupational Information System, (M.O.I.S.), Numerical Index code. NOTE: This information is located under Job Information with program description(s).

PROGRAM DEFINITIONS/GOALS

Vocational Education

The term "vocational education" means organized educational programs which are directly related to the preparation for paid or unpaid employment or for additional preparation for a career requiring other than a baccalaureate or advanced degree.[1]

---

[1]The Education Amendments of 1976, Section 195(1), Public Law 94-482.

Goals of Vocational-Technical Education

(1) To provide persons with differing sex, age, racial/ethnic backgrounds, social-economic status, academic disadvantage, economic disadvantage, limited English speaking ability, physical and mental capabilities, and geographical location access to vocational-technical education training or retraining.

(2) To coordinate pre-vocational exploration, career guidance, and placement programs so that each student may make informed and realistic occupational choices and have access to quality placement programs.

(3) To provide all students with learning experiences which are realistic and sufficient in light of their occupational objective.

(4) To insure that all vocational-technical programs will be planned, monitored, and evaluated in light of actual or anticipated employment opportunities and the demand by students for programs related to their abilities and occupational objectives.

Trade and Industrial Education

A vocational education curriculum that includes programs for manufacturing, construction, mechanical service, public service, health service, technical, and fisheries occupations, that prepares a person for entry level employment, upgrading or retraining in a semiskilled or skilled trade, semiprofessional or technical occupation, not generally classified as Agriculture, Distributive, Business or Office, in the Health profession, or Consumer/Home Economics in nature.

NOTE: The occupational clusters found within the scope of trade and industrial education include skilled or semiskilled trade, craft, or occupations which directly relate to the designing, producing, processing, assembling, maintaining, servicing, or repairing of any manufactured product.

TRADE AND INDUSTRIAL EDUCATION STUDENT ORGANIZATION

VICA

The Vocational Industrial Clubs of America (VICA) is the national organization serving trade, industrial, technical, and health occupations students in the United States. VICA incorporates leadership, citizenship, and character

development programs and activities into the skill training offered in America's schools and taught by men and women who have worked in the occupational areas in which they now instruct their students.

VICA emphasizes respect for the dignity of work, high standards in trade ethics, workmanship, scholarship, and safety. VICA promotes understanding of the free enterprise system and encourages development of patriotism through the practice of democracy within the club.

Competitive activities in the trade skills as well as areas such as public speaking, job interview, parliamentary procedure and safety are vital aspects of VICA's program.

TRADE AND INDUSTRIAL EDUCATION CURRICULUM GUIDE

This Michigan Trade and Industrial Education Curriculum Guide is the result of a project funded by the Michigan State Board of Education and the Michigan Department of Education, Vocational-Technical Education Service. The project is located at Michigan State University in the College of Agriculture and Natural Resources' Education Institute (ANREI) and is known as the Curriculum Resource Team.

The project is directed by Dr. Chris M. Olson and Ms. Carol E. Culpepper, Faculty Specialist, Curriculum Resource Team Coordinators. They were responsible for developing the curriculum format and working with a task force leader and committee of individuals from business, industry, and education to ensure the quality of the curriculum. The development of this curriculum was monitored by Melvin France, Secondary Trade and Industrial Education Supervisor.

The names of the occupational task force leader(s) committee members, secretaries, and other support staff are acknowledged after this Introduction.

The occupational program area(s) selected for curriculum development are based on a Vocational-Technical Education Service prioritized program

ranking based on employment demand, State average percent of placement, reimbursed enrollments, the number of programs, and entry level wages within the State of Michigan.

This curriculum guide was developed from the results of a statewide survey and job analysis of incumbent workers in the related occupational areas.

The curriculum guide is representative of the occupational job duty categories which list major activities and tasks performed on an entry level job. The curriculum guide contains a resource list and criteria statements which indicate the minimum standards of performance accepted as evidence of competence in completion of the task by business and industry. This is a task-based curriculum guide which helps a teacher develop a classroom management system where students learn by doing. It is based on task analysis and reflects the skills, knowledge, and attitudes that employers expect incumbent workers to possess.

The curriculum is linked to the labor market, helps the instructor open communication channels with business and industry, and manage classroom instruction where students learn "Need-to-Know" instead of "Nice-to-Know" facts.

This curriculum is adaptable for special needs/handicapped students, helps to validate the program, prepares students for entry level jobs and helps students to make career choices related to job placement.

It is the intent by all those involved in the development of this curriculum guide that it be used to provide relevant training or retraining for employment in the world of work.

The secondary occupational programs/courses in Michigan should meet the following minimum standards to assure soundness and quality of instruction:

(1) The program of instruction must be based on a consideration of the skills and knowledge required in the occupation for which the

instruction is being provided, and includes a planned logical sequence for those essentials of education or experience deemed necessary for the individual to meet an occupational objective.

(2) The program of instruction must be developed and conducted in consultation with a Local Advisory Council/Committee which has an appropriate representation of both sexes and an appropriate representation of racial and ethnic minorities found in the program area, school, and community origin. The local advisory council will advise on current job needs, relevance of programs, and courses in meeting current job needs and consult with the local educational agency in developing program application.

(3) The program of instruction will include the most up-to-date curriculum based on the competencies required in the occupation or occupational field in which the individual is being prepared, upgraded, or updated.

(4) The program of instruction will be sufficiently extensive in duration and intensive within a schedule unit of time to enable the student to develop the necessary knowledge, attitudes, and skills necessary for employment in the occupation or occupational field.

(5) The program of instruction will combine and coordinate related instruction with field, shop, laboratory, cooperative work, or other occupational experience which is appropriate to the vocational objective of the student, is of sufficient duration to develop competencies necessary for employment in the occupation or occupational field, and supervised, directed, or coordinated by a person qualified under the State Plan.

Facilities, equipment, and instructional materials:

(1) Classrooms, libraries, shops, laboratories, and other facilities, including instructional equipment, supplies, teaching aids, and other materials will be adequate in supply and quality to meet the standands approved by the State Board so that such facilities are adequate to enable those who are to be trained to meet the occupational objective for which the education is intended.

(2) If the State Board or local educational agency cannot provide adequate facilities and materials, and such are available in a business or industrial establishment, funds may be used to reimburse the local public educational agency for training programs conducted in private industry when it complies with the training standards and regulations established by the State Board. Such instruction shall be under the supervision and administration of a local public educational agency.

ACKNOWLEDGEMENT

The Michigan Trade and Industrial Curriculum Guide(s) were developed through a series of workshops held throughout the State and at Michigan State University during the 1982-83 school year.

Appreciation is given to all who have contributed their thoughts, time and energy to this curriculum project.

The Michigan Department of Education, Vocational-Technical Education Service, is indebted to the following individuals who were instrumental in the completion of this project and the development of the materials:

MSU Curriculum Resource Team

Dr. Chris M. Olson, Director
Ms. Carol Culpepper, Faculty Specialist
Ms. Carol A. Fosburg, Project Secretary

MSU Curriculum Resource Team
101 Wills House
Michigan State University
East Lansing, MI 48824

V-TES

Dr. Ed Cory, Vocational Education Consultant
Melvin France, Vocational Education Consultant
Ms. Irene Darrow, Secretary
Ms. Christy Erickson, Secretary

Michigan Department of Education
Vocational-Technical Education Service
P. O. Box 30009
Lansing, MI 48909

Construction Trades

Barry Smith (Task Force Leader)
St. Clair County Skill Center
499 Range Road; POCS-1
Marysville, MI 48040

Steve Barnum (Task Force Leader)
Lakewood High School
Route 3, Velte Road
Lake Odessa, MI 48849

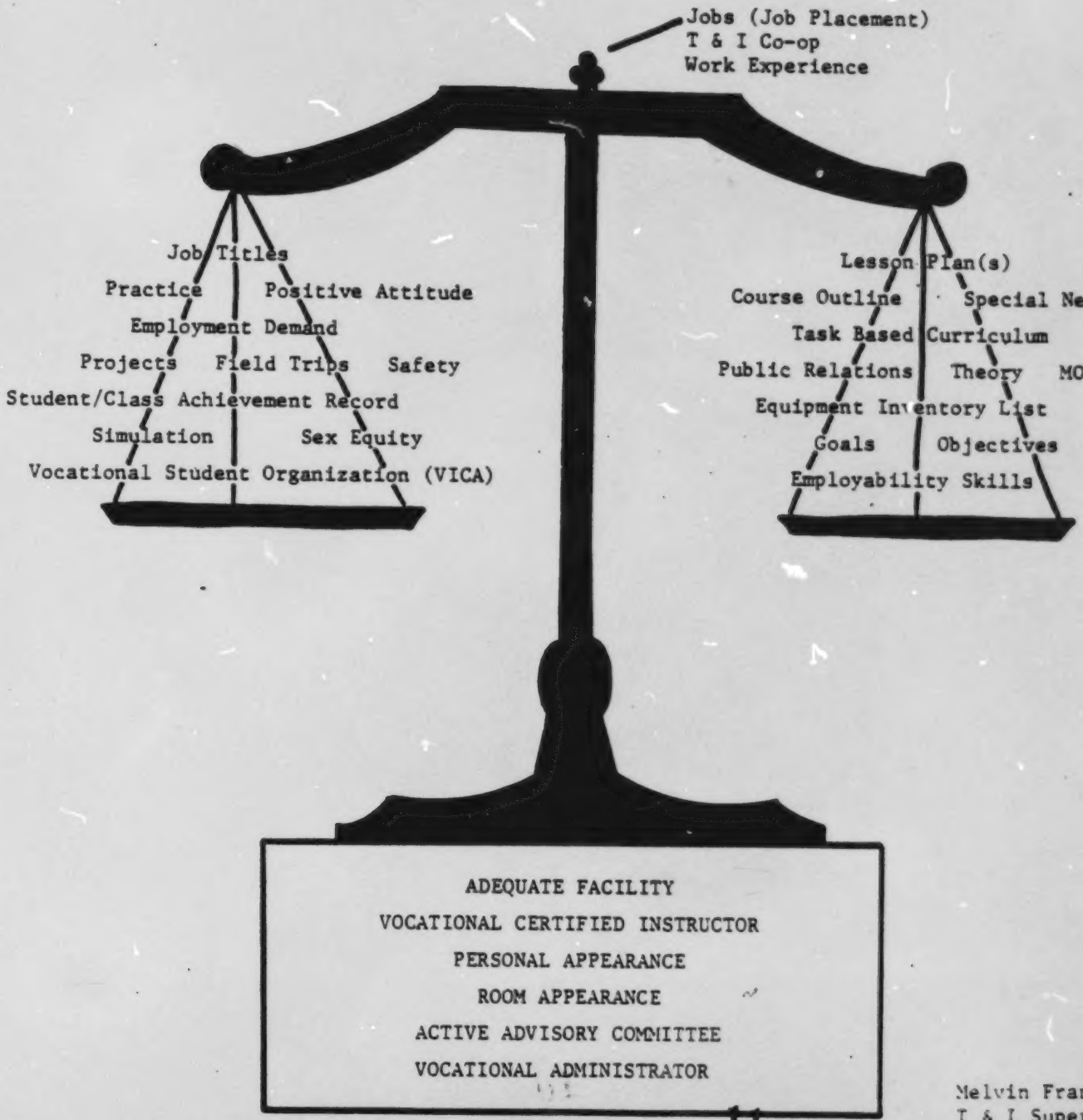
Lee Beauchamp
Niles High School
1441 Eagle Street
Niles, MI 49120

Duane Olds
Northeast Oakland Vocational
Education Center
1371 N. Perry Street
Pontiac, MI 48058

Robert Westdorp
Branch Area Career Center
366 Morse Street, Box 509
Coldwater, MI 49036

MICHIGAN TRADE AND INDUSTRIAL EDUCATION

IS YOURS A BALANCED PROGRAM?



Melvin France
T & I Supervisor
Secondary Unit

DEPARTMENT OF EDUCATION

STATE BOARD OF EDUCATION

EYE PROTECTIVE DEVICES

Filed with Secretary of State,

These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the state board of education by section 585a of Act No. 269 of the Public Acts of 1955, as added, being section 340.585a of the Compiled Laws of 1948.)

R 340.1301. Definitions.

Rule 1. As used in these rules:

(a) "Caustic" or "acid" means a material, exclusive of hot water or steam, capable of destroying, eroding or burning of flesh by chemical action.

(b) "Explosive material" means a substance capable of a large-scale, rapid and spectacular expansion which will propel materials in a manner causing injury to the human body.

(c) "Hot liquid" or "solid" means a material having effects that are physically harmful to the eyes.

(d) "Sanitizing" means the disinfecting and cleaning of eye protective devices before use.

(e) "When exposure to eye danger exists" means the exposure when a person is within that distance from sparks, flying particles, rays, molten metal, fumes, glare, glass breakage or chemical splash that such an object or condition could cause damage to his eyes, if he was not using a protective device.

R 340.1302. Educaticnal courses requiring eye protection.

Rule 2. A public educational agency which enrolls students in the following courses when exposure to eye danger exists, shall furnish eye protective devices: vocational or industrial arts shops or laboratories involving the use of or working with hot molten metals, milling, sawing, turning, shaping, grinding, cutting or stamping of any solid materials; heat treatment, tempering or kiln firing of any metal or other materials; gas or electric arc welding; repair or servicing of any vehicles; caustic or explosive materials; or chemical or combined chemical-physical laboratory work involving acid, caustic or explosive chemicals or hot liquids or solids.

R 340.1303. Standards for devices.

Rule 3. (1) An eye protective device shall meet the following standards based upon the operation involved:

(a) Acetylene burning, acetylene cutting, and acetylene welding operations - welding goggles of eyecup type with tinted lenses or welding goggles of coverspec type with tinted lenses or welding goggles of coverspec type with tinted plate lenses. This protects against the primary hazards of sparks, harmful rays, molten metal and flying particles.

(b) Chemical handling operations - goggles of flexible fitting with hooded ventilation or face shield with plastic or mesh window. This protects against the primary hazards of splash, acid burns and fumes.

(c) Chipping operations - goggles of flexible fitting with regular ventilation or goggles of cushioned fitting with rigid body or spectacles of metal frame with sideshields or spectacles of plastic frame with sideshields or spectacles of metal-plastic frame with sideshields or chipping goggles of eyecup type with clear safety lenses or chipping goggles of coverspec type with clear safety lenses. This protects against the primary hazard of flying particles.

(d) Electric (arc) welding operations - welding goggles of coverspec type with tinted plate lenses or welding helmets or welding helmet in combination with tinted lens spectacles. This protects against the primary hazards of sparks, intense rays and molten metal.

(e) Furnace operations - welding goggles of eyecup type with tinted lenses or welding goggles of coverspec type with tinted lenses or welding goggles of coverspec type with tinted plate lenses. This protects against the primary hazards of glare, heat and molten metal.

(f) Light grinding, machining, and spot welding operations - goggles of flexible fitting with regular ventilation or goggles of cushioned fitting with rigid body or spectacles of metal frame with sideshields or spectacles of plastic frame with sideshields or spectacles of metal-plastic frame with sideshields or face shield with plastic or mesh window. This protects against the primary hazards of flying particles and sparks.

(g) Heavy grinding operations - goggles of flexible fitting with regular ventilation or goggles of cushioned fitting with rigid body or chipping goggles of eyecup type with clear safety lenses or chipping goggles of coverspec type with clear safety lenses or in case of severe exposure add face shield with plastic or mesh window. This protects against the primary hazard of flying particles.

(h) Laboratory operations - goggles of flexible fitting with hooded ventilation or face shield in combination with metal or plastic frame spectacles with sideshields. This protects against the primary hazards of chemical splash and glass breakage.

(i) Molten metal operations - welding goggles of eyecup type with tinted lenses or welding goggles of coverspec type with tinted lenses or face shield in combination with metal or plastic frame spectacles with sideshields and tinted lenses. This protects against the primary hazards of heat, glare, sparks and splash.

(2) The standards described in subrule (1) are taken from the American National Standards Safety Code Z87.1-1968, figure 8, page 28, which is available from the American National Standards Institute, Incorporated, 1430 Broadway, New York, New York 10018, at a cost of $5.00. Applicable excerpts from the American National Standards Safety Code are available at no cost from the Michigan department of education, Lansing, Michigan.

R 340.1304. Sanitization of devices.

Rule 4. An eye protective device shall be sanitized when 2 or more students use the same device, by either:

(a) Washing after each use in warm water and soap or detergent, followed by a rinse in running water.

(b) Placing in a cabinet with ultraviolet light and washing once a week as in subdivision (a).

R 340.1305. Compliance.

Rule 5. (1) A superintendent of a school district shall certify to the intermediate school district superintendent not later than the second week of each school year, on forms prescribed by the Michigan department of education, that eye protective devices meeting the standards of these rules have been obtained. For the school year 1972-73, certification shall be made within 4 weeks after the effective date of these rules. This certification shall also indicate that instructors have been informed that all students, teachers and visitors shall wear the devices when exposure to eye damage exists, as identified in these rules.

(2) An intermediate school district superintendent shall report to the state superintendent of public instruction by October 1 the names of those constituent school districts which are not in compliance with these rules. For the school year 1972-73, the report shall be made within 6 weeks after the effective date of these rules.

(3) The state superintendent of public instruction shall notify a school district in violation of these rules that it shall comply or show cause why compliance cannot be made within 30 days.

ACT NO. 54 OF THE PUBLIC ACTS OF 1972

ENROLLED SENATE BILL NO. 553

AN ACT to amend Act No. 269 of the Public Acts of 1955, entitled "The Michigan School Code", and to repeal certain acts and parts of acts, as amended, being sections 340.1 to 340.984 of the Compiled Laws of 1948, by adding section 585a.

The People of the State of Michigan enact:

Section 1. Act No. 269 of the Public Acts of 1955, as amended, being sections 340.1 to 340.984 of the Compiled Laws of 1948, is amended by adding section 585a to read as follows:

Sec. 585a. (1) Every pupil and teacher participating in a course mentioned in this section shall wear industrial quality eye protective devices, which have been sanitized prior to use, when exposure to danger exists while participating in such course. The board of education shall furnish the devices for pupils, teachers and visitors to the classrooms or laboratories. The courses for which protective devices are required are:

(a) Vocational or industrial arts shops or laboratories involving the use of or working with hot molten metals, milling, sawing, turning, shaping, grinding, cutting or stamping of any solid materials; heat treatment, tempering or kiln firing of any metal or other materials; gas or electric arc welding; repair or servicing of any vehicle; or caustic or explosive materials.

(b) Chemical or combined chemical-physical laboratory work involving acid, caustic or explosive chemicals or hot liquids or solids.

(2) "Industrial quality eye protective devices" means devices meeting the standards of the american standard safety code for head, eye and respiratory protection, Z87.1-1968, promulgated by the american standards association, incorporated.

(3) The provisions of this section shall be enforced pursuant to rules promulgated by the state board of education in accordance with and subject to Act No. 306 of the Public Acts of 1969, as amended, being sections 24.201 to 24.315 of the Compiled Laws of 1948.

Section 2. This amendatory act shall take effect September 1, 1972.

The following adapted from the:

NATIONAL STANDARD SCHOOL SHOP SAFETY INSPECTION CHECK LIST

Prepared by the Joint Safety Committee of the
AMERICAN VOCATIONAL ASSOCIATION — NATIONAL SAFETY COUNCIL

_____ Date _____

INTRODUCTION

A *safe* environment is an essential part of the school shop *safety* education program. The *safe* environment will exist only if hazards are discovered and corrected through *regular* and *frequent* inspections by school personnel—administrators, teachers and students. Safety inspections are to determine if everything is satisfactory.

Inspections may be made at the request of the board of education, the school administration or upon the initiative of the teacher. Some communities have drawn upon the cooperative service of professional safety engineers, inspectors of state labor departments, insurance companies and local safety councils to supplement and confirm inspections by school personnel.

The National Standard School Shop Safety Inspection Check List, recommended by the President's Conference on Industrial Safety is an objective inspection procedure for the school shop.

DIRECTIONS

WHO INSPECTS?

This will depend upon local policies. It is recommended, however, that shop teachers, and students—the student safety engineer and/or student safety committee—participate in making regular inspections. This not only tends to share responsibility but stimulates a broader interest in the maintenance of a safe school shop.

WHEN TO INSPECT?

As a minimum, a safety inspection should be made at the beginning of every school term or semester. More frequent inspections may be advisable.

HOW TO INSPECT?

Inspections should be well planned in advance.

Inspections should be systematic and thorough. No location that may contain a hazard should be overlooked.

Inspection reports should be clear and concise, but with sufficient explanation to make each recommendation for improvement understandable.

FOLLOW-UP

The current report should be compared with previous records to determine progress. The report should be studied in terms of the accident situation so that special attention can be given to those conditions and locations which are accident producers.

Each unsafe condition should be corrected as soon as possible in accordance with accepted local procedures.

A definite policy should be established in regard to taking materials and equipment out of service because of unsafe conditions.

The inspection report can be used to advantage as the subject for staff and class discussion.

CHECKING PROCEDURE

Draw a circle around the appropriate letter, using the following letter scheme:

S — Satisfactory (needs no attention)
A — Acceptable (needs some attention)
U — Unsatisfactory (needs immediate attention)

Recommendations should be made in all cases where a "U" is circled. Space is provided at the end of the form for such comments. Designate the items covered by the recommendations, using the code number applicable (as B-3).

In most categories, space is provided for listing of standards, requirements or regulations which have local application only.

A. GENERAL PHYSICAL CONDITION

1. Machines, benches, and other equipment are arranged so as to conform to good safety practices ..... S A U
2. Condition of stairways ..... S A U
3. Condition of aisles ..... S A U
4. Condition of floors ..... S A U
5. Condition of walls, windows, and ceiling ..... S A U
6. Illumination is safe, sufficient, and well placed ..... S A U
7. Ventilation is adequate and proper for conditions ..... S A U
8. Temperature control ..... S A U
9. Fire extinguishers are of proper type, adequately supplied, properly located and maintained ..... S A U
10. Teacher and pupils know location of and how to use proper type for various fires ..... S A U
11. Number and location of exits is adequate and properly identified ..... S A U
12. Proper procedures have been formulated for emptying the room of pupils and taking adequate precautions in case of emergencies S A U
13. Lockers are inspected regularly for cleanliness and fire hazards. S A U
14. Locker doors are kept closed ..... S A U
15. Walls are clear of objects that might fall ..... S A U
16. Utility lines are properly identified ..... S A U
17. Teachers know the procedure in the event of fire including notification of the fire department and the evacuation of the building. S A U
18. Air in shop is free from excessive dust, smoke, etc. .... S A U
19. _____ S A U
20. _____ S A U
21. _____ S A U
22. _____ S A U
23. Evaluation for the total rating of A. GENERAL PHYSICAL CONDITION ..... S A U

BEST COPY AVAILABLE

B. HOUSEKEEPING

1. General appearance as to orderliness..... S A U
2. Adequate and proper storage space for tools and materials. S A U
3. Benches are kept orderly..... S A U
4. Corners are clean and clear..... S A U
5. Special tool racks, in orderly condition, and provided at benches and machines..... S A U
6. Tool, supply, and/or material room is orderly..... S A U
7. Sufficient scrap boxes are provided..... S A U
8. Scrap stock is put in scrap boxes promptly..... S A U
9. Materials are stored in an orderly and safe condition.. S A U
10. A spring lid metal container is provided for waste and oily rags. S A U
11. All waste materials and oily rags are promptly placed in the containers..... S A U
12. Containers for oily rags and waste materials are frequently and regularly emptied..... S A U
13. Dangerous materials are stored in metal cabinets..... S A U
14. Machines have been color conditioned..... S A U
15. Safety cans are provided for flammable liquids..... S A U
16. Bulk storage of dangerous materials is provided outside of the main building..... S A U
17. A toe-board or railing around a mezzanine used for storage or washing facilities..... S A U
18. Materials are stored in an orderly and safe condition on this mezzanine..... S A U
19. Flammable liquids are not used for cleaning purposes S A U
20. Floors are free of oil, water and foreign material..... S A U
21. Floors, walls, windows, and ceilings are cleaned periodically. S A U
22. _____ S A U
23. _____ S A U
24. _____ S A U
25. _____ S A U
26. Evaluation for the total rating for B. HOUSEKEEPING S A U

C. EQUIPMENT

1. Machines are arranged so that workers are protected from hazards of other machines, passing students, etc..... S A U
2. Danger zones are properly indicated and guarded..... S A U
3. All gears, moving belts, etc., are protected by permanent enclosure guards..... S A U
4. All guards are used as much as possible..... S A U

C. EQUIPMENT (continued)

5. All equipment control switches are easily available to operator S A U
6. All machines are "locked off" when instructor is out of the room S A
7. Brushes are used for cleaning equipment..... S A U
8. Nonskid areas are provided around machines..... S A U
9. Machines are in safe working condition..... S A U
10. Machines are guarded to comply with American Standards Association and local state code..... S A U
11. Adequate supervision is maintained when students are using machines and dangerous tools..... S A U
12. Tools are kept sharp, clean and in safe working order S A U
13. All hoisting devices are in safe operating condition... S A U
14. Machines are shut off while unattended..... S A U
15. Adequate storage facilities for tools, equipment, etc., not in immediate use..... S A U
16. _____ S A U
17. _____ S A U
18. _____ S A U
19. _____ S A U
20. Evaluation for the total rating for C. EQUIPMENT.. S A U

D. ELECTRICAL INSTALLATION

1. All switches are enclosed..... S A U
2. There is a master control switch for all of the electrical installations..... S A U
3. Electrical outlets and circuits are properly identified.. S A U
4. All electrical extension cords are in safe condition and are not carrying excessive loads..... S A U
5. All machine switches are within easy reach of the operators. S A U
6. Electrical motors and equipment are wired to comply with the National Electric Code..... S A U
7. Individual cut-off switches are provided for each machine. S A U
8. Machines are provided with overload and underload controls by magnetic pushbutton controls..... S A U
9. No temporary wiring in evidence..... S A U
10. _____ S A U
11. _____ S A U
12. _____ S A
13. _____ A U
14. Evaluation for the total rating for D. ELECTRICAL INSTALLATION..... S A U

BEST COPY AVAILABLE

E. GAS

1. Gas flow to appliances is regulated, so that when appliance valve is turned on full, the flames are not too high..... S A U

2. Gas appliances are properly insulated with asbestos or other insulating material from tables, benches, adjecent walls, or other flammable materials ..... S A U

3. No gas hose is used where pipe connections could be made. S A U

4. Gas appliances have been adjusted so that they may be lighted without undue hazard..... S A U

5. Students have been instructed when lighting gas appliances to light the match first before turning on the gas..... S A U

6. There are no gas leaks, nor is any odor of gas detectable in any part of the shop..... S A U

7. Shop instruction has been given concerning the lighting of gas furnaces operating with both air and gas under pressure.. S A U

8. When lighting the gas forge, goggles are worn..... S A U

9. When lighting the gas furnace, the following procedure is used: (a) light the match; (b) turn on the gas; (c) drop the match in the hole in top of the furnace..... S A U

10. In shutting down the gas furnace, the gas valve is closed before the air valve..... S A U

11. _____ S A U

12. _____ S A U

13. _____ S A U

14. _____ S A U

15. Evaluation for the total rating for E. GAS..... S A U

F. PERSONAL PROTECTION

1. Goggles or protective shields are provided and required for all work where eye hazards exist..... S A U

2. If individual goggles are not provided, hoods and goggles are properly disinfected before use..... S A U

3. Shields and goggles are provided for electric welding.. S A U

4. Rings and other jewelry are removed by pupils when working in the shop..... S A U

5. Proper kind of wearing apparel is worn and worn properly for the job being done..... S A U

6. Leggings, safety shoes, etc., are worn in special classes such as foundry, etc., when needed..... S A U

7. Respirators are provided for dusty or toxic atmospheric conditions such as when spraying in the finishing room..... S A U

8. Provisions are made for cleaning and sterilizing respirators. S A U

9. Students are examined for safety knowledge ability.. S A U

10. Sleeves are rolled above elbows when operating machines. S A U

11. Clothing of students is free from loose sleeves, flopping ties, loose coats, etc. ..... S A U

12. _____ S A U

F. PERSONAL PROTECTION (continued)

13. _____ S A U

14. _____ S A U

15. _____ S A U

16. Evaluation for the total rating for F. PERSONAL PROTECTION. S A U

G. INSTRUCTION

1. Shop Safety is taught as an integral part of each teaching unit. S A U

2. Safety rules are posted particularly at each danger station. S A U

3. Printed safety rules are given each student..... S A U

4. Pupils take a safety pledge..... S A U

5. Use of a safety inspector..... S A U

6. Use of a student shop safety committee..... S A U

7. Use of safety contests..... S A U

8. Motion and/or slide films on safety are used in the instruction. S A U

9. Use of suggestion box..... S A U

10. Use of safety tests..... S A U

11. Use of safety posters..... S A U

12. Talks on safety are given to the classes by industrial men. S A U

13. Tours are taken of industrial plants as a means of studying safety practices ..... S A U

14. Periodic safety inspections of the shop are made by a student committee ..... S A U

15. Men from industry make safety inspections of the shop S A U

16. Student shop safety committee investigates all accidents S A U

17. A proper record is kept of safety instructions which are given, preferably showing the signature of student on tests given in this area ..... S A U

18. Rotate students on the Shop Safety Committee so that as many students as possible have an opportunity to participate... S A U

19. _____ S A U

20. _____ S A U

21. _____ S A U

22. _____ S A U

23. Evaluation for the total rating of G. INSTRUCTION S A U

H. ACCIDENT RECORDS

1. There is a written statement outlining the proper procedure when and if a student is seriously hurt..... S A U

2. Adequate accident statistics are kept..... S A U

3. Accidents are reported to the proper administrative authority by the instructor ..... S A U

BEST COPY AVAILABLE

H. ACCIDENT RECORD (continued)

4. A copy of each accident report is filed with the State Department of Education ..... S A U

5. Accident reports are analyzed for instructional purposes and to furnish the basis for elimination of hazards..... S A U

6. _____ S A U

7. _____ S A U

8. _____ S A U

9. _____ S A U

10. Evaluation for the total rating of H. ACCIDENT RECORDS. S A U

I. FIRST AID

1. An adequately stocked first aid cabinet is provided. S A

2. The first aid is administered by a qualified individual S A

3. The school has individuals qualified to administer first aid. S A

4. _____ S A

5. _____ S A

6. _____ S A

7. _____ S A

8. Evaluation for the total rating of I. FIRST AID.... S A

RECOMMENDATIONS

Code No.	

For additional copies in packets of 50 send $1.42 to National Safety Council, 444 North Michigan Avenue, Chicago, Ill. 60611

Revd. 8/76
Reg. 10M57601

Printed in U.S.A.

Stock No 429

BEST COPY AVAILABLE

46.0000 Construction Trades

A summary of groups of instructional programs that prepare individuals to erect, install, maintain, and repair buildings, highways, airports, missile sites, and other structures using materials such as metal, wood, stone, brick, glass, concrete, and composition substances. Includes instruction in cost estimating; cutting, fastening, and fitting various materials; the use of hand and power tools; and in following technical specifications and blueprints.

Course 01 Construction - On-Site

An approved instructional program that prepares individuals in the accomplishment of the tasks for CIP Code 46.0000 where a product or service is rendered to certain private individuals or public sectors of the surrounding community. The most frequent products of this activity are residential housing units which are sold by the LEA or a third party. Included in this code are programs dealing specifically with residential house construction, modular home, or shed building where such units are sold at a set price or on a bid price system. This code also deals with renovation or add on types of construction where building supplies and/or materials are provided or donated for use in a permanent structure or product.

Course 02 Construction - In-School

An approved instructional program that prepares individuals in the accomplishment of the tasks for CIP Code 46.0000 utilizing the mock-up, build-up, teardown concept of instruction. Included in this definition would be programs specifically dealing with simulation of residential and commercial construction, in a school setting, with experience gained in wall building, wiring, roofing, masonry, concrete work, tools of the trade and all other skills which may be acquired in a classroom or laboratory setting. An in-school program is a higher cost program because the building materials are consumed on a one-time basis which necessitates the purchasing of significant materials for each section. The materials are not sold, but are utilized in the natural course of instruction.

46.0503 Plumbing and Pipefitting

An approved instructional program that prepares individuals to assemble, install, and maintain piping and piping systems, fixtures, fittings and drainage systems for heating, cooling, sprinkling, and industrial processing systems. Instruction is given in material selection and use of tools to cut, bend, join, and weld pipes according to specifications and plumbing codes.

VOCATIONAL COOPERATIVE EDUCATION

Definition

"The term 'cooperative education' means a program of vocational education for persons who, through written cooperative arrangements between the school and employers, receive instruction, including required academic courses and related vocational instruction by alternation of study in school with a job in any occupational field, but these two experiences must be planned and supervised by the school and employers so that each contributes to the student's education and to his or her employability. Work periods and school attendance may be on alternate half days, full days, weeks, or other periods of time in fulfilling the cooperative program." (P.L. 94-482)

Responsibilities of School District

The local school district must meet all the Federal requirements of P.L. 94-482, Section 122; 45 CFR 104.531 through 104.533 and the State of Michigan Statutes and General School Laws listed below:

A. IT IS A PROGRAM OF VOCATIONAL EDUCATION.

"Vocational program" means laboratory, simulation or instruction based upon individually designed learning experiences in a vocational subject preparing the student for competencies required in a recognized occupation coded in accordance with the most recent vocational education listing of programs by the United States Department of Education.

B. THERE IS A WRITTEN AGREEMENT BETWEEN THE SCHOOL AND EMPLOYERS.

The Youth Employment Standards Act (P.A. 90 of 1978) governs the legal employment of minors in Michigan. In section 18 of the Act, a provision is made to allow a written agreement, or contract, to be entered into between an employer and the board of education of the school district, in which the minor is enrolled. This written agreement exempts a student from obtaining a work permit and allows the student to be legally employed in Michigan. The employment, however, shall not be in violation of a Federal Statute or regulation and a signed copy of the agreement shall be on file in the place of employment before a minor begins employment. The training agreement, in cooperative education, is the legal written agreement developed cooperatively between the employer, teacher-coordinator, student, and parent and outlines the responsibilities of the employer and student to the program and establishes the legal conditions of the student-learner's employment.

C. THERE IS INSTRUCTION (INCLUDING REQUIRED ACADEMIC INSTRUCTION) IN SCHOOL RELATED TO THE JOB IN ANY OCCUPATIONAL AREA.

The program is of sufficient duration to develop competencies necessary to prepare the learner for employment. It provides a coordinated instructional program combining supervised part-time employment and

classroom instruction related to the learner's job. Related vocational instruction for cooperative education enrollees shall be scheduled weekly.

D. THE ALTERNATION OF STUDY AND WORK ARE PLANNED AND SUPERVISED BY THE SCHOOL AND EMPLOYER IN ORDER TO FURTHER THE STUDENT'S EDUCATION AND EMPLOYABILITY.

The student-learner shall be employed for an average of not less than 15 hours per week during the effective time of the individual's program. The school shall have the responsibility of providing coordination and supervision services during such time.

E. STUDENTS ARE EMPLOYED AND COMPENSATED IN CONFORMITY WITH FEDERAL, STATE AND LOCAL LAWS.

The program provides cooperative on-the-job training that (1) employs and compensates student-learners in conformity with Federal, State, and local laws and regulations and in a manner not resulting in exploitation of the student-learner for private gain, and (2) is conducted in accordance with written training agreements between local education agencies and employers.

References

Individuals requiring additional information pertaining to cooperative education principles and practices are asked to consult the Michigan Department of Education, Vocational-Technical Education Service, developed Cooperative Education Handbook available in September of 1981.

WORK EXPERIENCE

PAID WORK EXPERIENCE

Definition

Paid work experience programs are school-sponsored and supervised employment programs. Students are allowed to earn academic credit while employed in the community. The employment serves as a means of acquiring desirable work habits and attitudes towards the world of work. The employment is not necessarily related to a student's career interest and enrollment in a related vocational education program is not required.

Objectives

Paid work experience programs are designed to provide students an opportunity to:

1. Foster positive attitudes about work, school and society
2. Promote an understanding in the dignity of work
3. Develop a student's ability to understand and function in an employer-employee relationship
4. Earn wages to remain in school
5. Experience an alternative to the traditional school program

Guidelines

1. Written work agreements should be completed between the employer, student, parent and school
2. Written work agreements should be completed in conformance to all Federal, State and local laws, rules and regulations; including non-discrimination against any student because of race, color, sex, national origin or ancestry. This policy of non-discrimination shall also apply to otherwise qualified handicapped individuals
3. Related academic instruction, where possible, should be provided
4. A school work experience coordinator should be provided to serve as a liaison between the student, employee, parents and school officials
5. Academic credit should be awarded for participation in the program

Funding

The Michigan Department of Education, the Vocational-Technical Education Service does not fund paid work experience programs.

UNPAID WORK EXPERIENCE

Definition

Unpaid work experience is a school sponsored and supervised instructional technique used in vocational education programs in which students are placed with an employer for a limited time and are not compensated during the duration of the experience.

Objectives

Unpaid work experience programs are designed to provide students with an opportunity to:

1. Receive on-site exposure to various businesses and industries while participating in a related vocational education program
2. Develop a realistic understanding of the relationship between education and the world of work
3. Enhance a positive self-image
4. Assist in the selection of occupational choices
5. Expand learning opportunities by using community resources

Guidelines

1. The training, even though it includes actual operation of the facilities of the participating employer is similar to that given in a vocational school
2. The training is for the benefit of the trainee
3. The trainee does not displace a regular employee, but does work under a regular employee's close observation
4. The participating employer does not derive an immediate advantage from the activities of the trainee
5. The trainee is not necessarily entitled to a job at the conclusion of the training period
6. The trainee is not entitled to wages for the time spent in the training
7. The training is for not more than 45 hours with a participating employer during each school semester
8. The training is conducted under a written work experience training agreement between the school district and the participating employer

Funding

The Michigan Department of Education, the Vocational-Technical Education Service does not fund unpaid work experience but considers it to be an allowable instructional activity under a given vocational education program.

WORK EXPERIENCE AND CAREER EXPLORATION PROGRAM (W.E.C.E.P.)

I. Definition

The Work Experience and Career Exploration Program (W.E.C.E.P.) is a school-supervised and administered program that includes part-time work as an integral part of an educational program aimed at motivating 14 and 15 year-old youth toward education and preparing them for the world of work.

II. Program Objectives

There are several objectives of a W.E.C.E.P. program:

A. To provide a career-oriented educational program for dropout prone youth to become oriented and motivated toward education and the world of work.

B. To increase the desire to learn and improve educational performance.

C. To develop a greater degree of self-confidence, responsibility and aid in the maturation process of the student participants.

D. To provide student participants with on-the-job learning experiences that are in harmony with their interests, needs and objectives.

E. To improve school adjustment of student participants for whom the traditional curriculum is found to be inadequate.

F. To promote personal and social adjustment of the student participants and establish emotional stability through a feeling of being engaged in worthwhile activity.

III. Instructional Content

W.E.C.E.P. programs are planned so as to include part-time work supervised by employers and school personnel, as an integrated part of the enrollee's educational program. Students receive work experience on jobs permitted or approved under Federal or State laws. Students are in class with a W.E.C.E.P. teacher-coordinator for job-related and occupational safety, including needed individualized or remedial instruction. Students also receive a minimum of 20 hours of instruction on the Michigan Occupational Information System (MOIS) and a minimum of 30 hours of employability skills instruction. The students' employment is under the supervision of W.E.C.E.P. teacher-coordinators and employers. Students receive all State required courses necessary for graduation. The W.E.C.E.P. program is planned so that the students' individual academic achievement potential is recognized.

IV. Program Organization

The Vocational-Technical Education Service, Michigan Department of Education requires that W.E.C.E.P. programs in local districts meet the following criteria:

A. Eligibility. Any student aged 14 or 15 years, whom authoritative local school personnel identify as being able to benefit from the program, shall be eligible to participate.

B. Credits. Students shall receive school credits for both in-school related instruction and on-the-job experience.

C. Size. Each program unit shall consist of 12 to 25 students to one W.E.C.E.P. teacher-coordinator.

D. Instructional Schedule. W.E.C.E.P. students will spend a minimum of four periods daily in classroom instruction including one period of 180 hours of instruction devoted to job-related and employability skill instruction, safety and career exploration. Each student will have a minimum of 20 hours of career exploration utilizing the Michigan Occupational Information System (MOIS) and have a minimum of 30 hours of instruction in employability skills training. The employability skills training will equal or exceed the employability skills performance objectives adopted, as part of Michigan Vocational-Technical Service programs. Each local district submitting a letter of application to operate a W.E.C.E.P. program will furnish to the Vocational-Technical Education Service a course outline for the related class.

E. W.E.C.E.P. Teacher-Coordinator. Each program unit shall be under the supervision of a school official to be designated for the purpose of the program as a W.E.C.E.P. teacher-coordinator, who shall generally supervise the program and coordinate the work and education aspects of the program and make regularly scheduled visits to the work stations.

F. Written W.E.C.E.P. Training Agreement. No student shall participate in the program until there has been made a written E.E.C.E.P. training agreement signed by the W.E.C.E.P. teacher-coordinator, the employer and the student. The agreement shall also be signed or otherwise consented to by the student's parent or guardian. The W.E.C.E.P. training agreement will detail job tasks and related in-school instruction. A sample W.E.C.E.P. training agreement will be submitted annually by the local district to the Vocational-Technical Education Service.

G. Provision for Health and Well-Being. Employment under W.E.C.E.P. will not interfere with the schooling of the minors or with their health and well-being.

H. Records and Reports. The names and addresses of each school and the names and addresses of each employer enrolling work experience and career exploration program students and the number of enrollees in each unit shall be kept at the Vocational-Technical Education Service's office. A copy of the written W.E.C.E.P. training agreement for each student participating in the program shall be kept in the local educational office. The records required (for this paragraph) shall be kept for a period of three years from the date of enrollment in the program and shall be made available for inspection or transcription to the representatives of the Administrator of the Wage and Hour Division. Each school district operating a W.E.C.E.P. program shall submit an annual evaluative report by June 30th, which details the results of the W.E.C.E.P. program in terms of attendance and tardiness patterns, grade point average trends and dropout statistics of the enrollees. Based on a favorable state agency evaluation, a local district will be approved on an annual basis to operate a W.E.C.E.P. program. Under no circumstances can a local district operate a W.E.C.E.P. program without first obtaining written state agency approval for the program.

I. Approved Occupations. Employment of minors enrolled in a W.E.C.E.P. program approved pursuant to the requirements of this section shall be permitted in all occupations except the following:

1. Manufacturing and mining.

2. Occupations declared to be hazardous for the employment of minors between 16 and 18 years of age in Subpart E of Part 570 Child Labor Regulations, Orders and Statements of Interpretation of the Federal Fair Labor Standards Act, and occupations in agriculture declared to be hazardous for employment of minors below the age of 16 in Subpart E-1 of this part.

3. Occupations other than those permitted under sections 570.33 and 570.34 except upon approval of a variation in individual cases or classes of cases by the Administrator of the Wage and Hour Division after notice to interested persons and opportunity to be heard.

Employment of minors enrolled in a W.E.C.E.P. program approved pursuant to the requirements of this section shall be confined to not more than 23 hours in any week when school is in session and not more than three hours in any day when school is in session, any portion of which may be during school hours.

Employment of W.E.C.E.P. participants must not have the effect of displacing a worker in the establishment of the employer. Participants in W.E.C.E.P. must be paid according to the statutory minimum wage provision of the Fair Labor Standards Act.

V. Approval of Local Programs

Local school districts desiring approval to operate a W.E.C.E.P. program must submit an annual letter of application by June 30th to the

Michigan Department of Education
Vocational-Technical Education Service
Secondary Unit
Box 30009
Lansing, MI 48909
(517) 373-3365

VOCATIONAL WORK-STUDY

Definition and Purpose

The vocational work-study program is for those students who are in need of earnings from employment in order to commence or continue their vocational education programs.

Administration

The work-study program shall be administered by local educational agencies and made available, to the extent of available funds, to all qualified youth, in the area served by such agencies, who meet requirements.

Eligible Students

Employment under the work-study program shall be furnished only to a student who (a) has been accepted for enrollment or, if already enrolled, is in good standing and in full time attendance as a full-time student in a vocational education program which meets the standards of the state board and of the local educational agency and the requirements of the state plan, (b) is in need of the earnings from such employment to commence or continue a vocational education program, and (c) is at least 15 years of age and less than 21 years of age at the date of commencement of employment and is capable in the opinion of the appropriate school authorities of maintaining good standing in a school program while employed under the work-study program.

Limitation of Hours and Compensation of Employment

No student shall be employed under a vocational work-study program for more than 20 hours in any week in which classes in which the student is enrolled are in session. Summer employment shall not exceed 40 hours per week.

Employers

Employment under work-study programs shall be for the local educational agency or for some other public agency or institution, federal, state, or local and work so performed shall be adequately supervised and coordinated and shall not supplant present employees of such agency or institution who ordinarily perform such work. In those instances where employment under work-study programs is for a federal agency or institution, the written arrangement between the local educational agency and the federal agency or institution shall state that students so employed are not federal employees for any purpose.

Amounts Spent for Employment

In each fiscal year during which the work-study program remains in effect, the local educational agency shall expend for employment of its students an amount in state and/or local funds that is not less than the average annual expenditure for work-study programs of a similar nature during the three fiscal years preceding in which the supplementary plan provisons for its work study program are approved.

Applications, Priorities, and Approval

Work-study programs shall be approved on an individual basis by the state board and shall be consistent with the policies and procedures set forth.

Applications by Local Educational Agencies

Local educational agencies shall submit project proposals to the state board staff for approval in a manner similar to other vocational education programs.

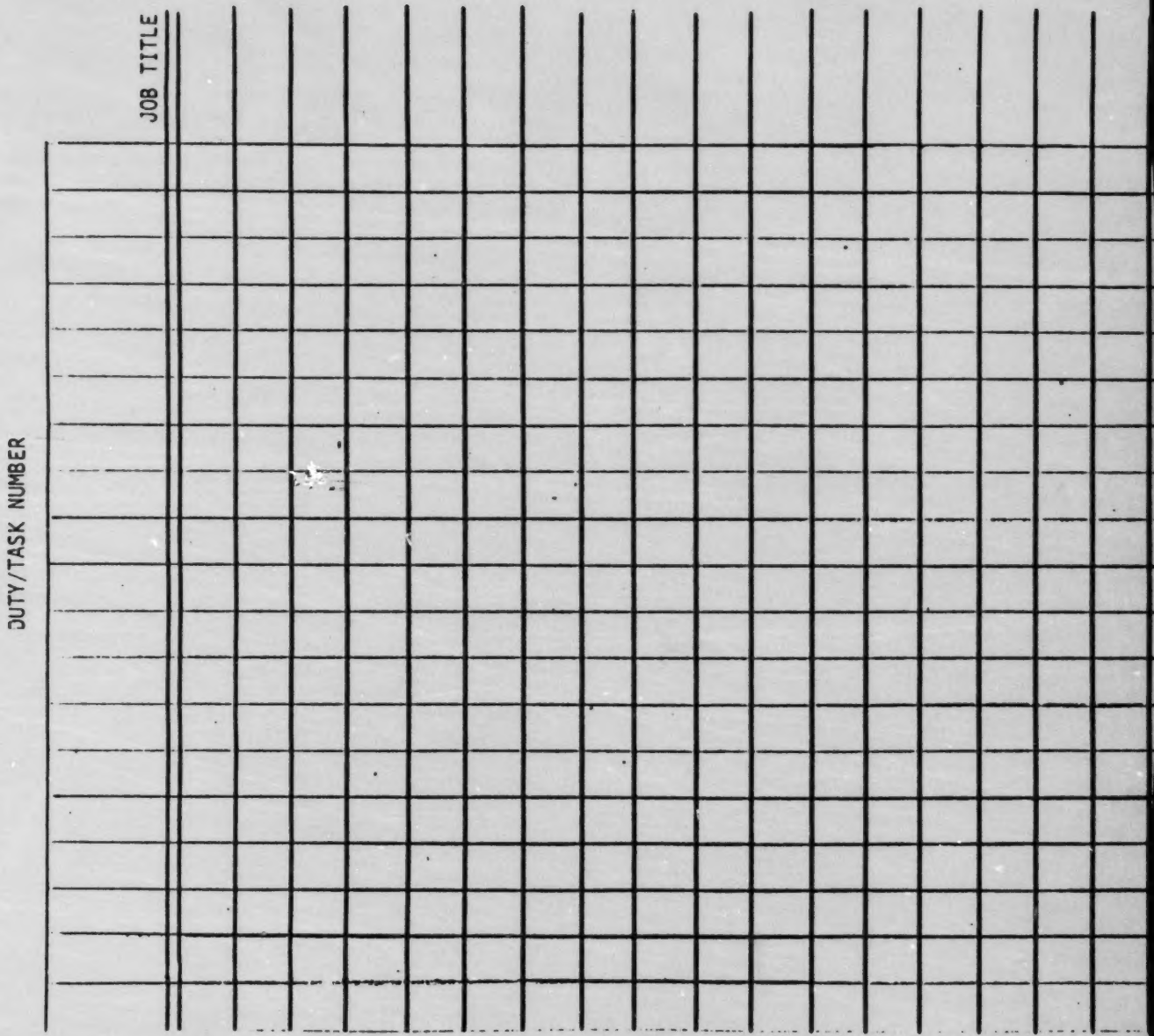
Priority of Projects

Work-study programs will be provided, insofar as financial resources are available, for the undertaking of such programs in the order determined by the application of criteria for determining relative priority of projects which shall include preference for local educational agencies serving communities having substantial numbers of dropouts and unemployed youths and may include other relevant factors such as the extent to which the local educational agencies are using guidance and counseling and other related services designed to achieve the purposes of the work-study program.

PLUMBING
JOB TITLES

D.O.T.	JOB TITLE
862.381-030	Plumber

DUTY/TASK - JOB MATRIX



TASK LISTING
FOR
PLUMBING

A. PERFORMING GENERAL PLUMBING ACTIVITIES

1. Determine plumbing requirements using code book to meet local standards.
2. Demonstrate blueprint reading using procedures to meet plumbing standards.
3. Specify plumbing materials using plans and specifications to complete job.
4. Compute bids using plans, specifications, and current costs to submit for approval.
5. Secure permits using plans and specifications to receive approvals for planned plumbing work.
6. Demonstrate plumbing tools using appropriate tools to show proper use.
7. Calculate building sewer slope using necessary tools and equipment to meet plumbing code requirements.

B. JOINING PIPES

1. Join pipe using arc welder and filler metal to meet plumbing code requirements.
2. Cut copper tubing using a hacksaw to meet job requirements.
3. Cut copper tubing using a tubing cutter to meet job requirements.
4. Join copper tubing to brass pipe using various plumbing tools to meet job requirements.
5. Join copper tubing to copper pipe using various plumbing tools to meet job requirements.
6. Join copper tubing to plastic pipe using various plumbing tools to meet job requirements.
7. Join copper pipe to plastic pipe using sweat method and proper plumbing tools to meet job requirements.
8. Join copper tubing to steel pipe using various plumbing tools to meet job requirements.

B. JOINING PIPES (continued)

9. Join copper tubing using compressed connectors and proper plumbing tools to meet job requirements.

10. Join plastic pipe using solvent cement method and proper plumbing tools to meet job requirements.

11. Join plastic pipe to steel pipe using proper techniques and proper plumbing tools to meet job requirements.

12. Join plastic pipe to copper pipe using proper techniques and proper plumbing tools to meet job requirements.

13. Join pipe using no-hub couplings and proper plumbing tools to meet job requirements.

14. Join plastic pipe to cast iron pipe using no-hub couplings and proper plumbing tools to meet job requirements.

15. Install pipe sleeves or thimbles using necessary tools to meet plumbing standards.

C. INSTALLING WASTE LINES

1. Install waste lines using necessary equipment to meet plumbing standards.

2. Install bathtubs using necessary equipment to meet plumbing standards.

3. Rough in bath tub waste line and vent using necessary equipment to meet plumbing standards.

4. Install expansion joints using necessary tools to meet plumbing standards.

5. Rough in lavatory waste line and vent using necessary equipment to meet plumbing standards.

6. Rough in dishwasher waste line and vent using necessary equipment to meet plumbing standards.

7. Rough in floor mounted water closet waste line and vent using necessary equipment to meet plumbing standards.

8. Rough in shower bath waste line and vent using necessary equipment to meet plumbing standards.

C. INSTALLING WASTE LINES (continued)

9. Rough in wall-mounted urinal waste line and vent using necessary equipment to meet plumbing standards.

10. Install roof flashing using necessary equipment to meet plumbing standards.

11. Secure pipe using hangers to meet plumbing standards.

12. Test house drain using necessary equipment to meet plumbing standards.

D. BUILDING DRAINS

1. Lay out house drains using necessary equipment to meet plumbing standards.

2. Lay out trench lines using necessary tools to meet plumbing standards.

3. Install drain lines in trenches using necessary tools to meet plumbing standards.

4. Backfill trenches using necessary tools to meet plumbing standards.

5. Bend flexible copper tubing using a spring bender to meet job requirements.

6. Cut steel pipe using pipe cutter to meet plan requirements.

7. Thread steel pipe using adjustable die to meet plumbing standards.

8. Thread steel pipe using non-adjustable die to meet plumbing standard.

9. Thread steel pipe using power-driven vise stand to meet plumbing standards.

10. Braze pipe using gas torch and filler metal to meet job requirements.

11. Bend steel pipe using heavy duty pipe bending tool and oxyacetylene torch and bender to meet plan requirements.

12. Weld pipe using oxyacetylene torch and filler metal to meet plumbing standards.

13. Wipe clay pipe joints using proper plumbing tools to meet job requirements.

D. BUILDING DRAINS (continued)

14. Cut cast iron pipe using proper plumbing tools to meet job requirements.

15. Cut concrete pipe using proper plumbing tools to meet job requirements.

E. INSTALLING WATER LINES

1. Calculate water line grades using necessary tools to meet plumbing standards.

2. Install water lines using necessary tools to meet plumbing standards.

3. Install water storage tanks using necessary tools to meet plumbing standards.

4. Install cut-off valves using necessary tools to meet plumbing standards.

5. Install water storage tanks using necessary tools to meet plumbing standards.

6. Install lawn sprinkler system using necessary tools to meet plumbing standards.

7. Install pressure relief valves using necessary tools to meet plumbing standards.

8. Install prefabricated air chamber using necessary equipment to meet plumbing standards.

9. Rough in bath tub supply lines using necessary tools to meet plumbing standards.

10. Rough in water closet supply lines using necessary tools to meet plumbing standards.

11. Rough in water heater water lines using necessary tools to meet plumbing standards.

12. Rough in wall-mounted urinal supply lines using necessary tools to meet plumbing standards.

13. Insulate water lines using necessary tools to meet plumbing standards.

14. Rough in sink supply lines using necessary tools to meet plumbing standards.

36

E. INSTALLING WATER LINES (continued)

15. Install electric water heater using necessary equipment to meet plumbing standards.

16. Install gas water heater using necessary equipment to meet plumbing standards.

17. Install hose bib using necessary equipment to meet plumbing standards.

18. Water pressure test water supply sytem using necessary tools to meet plumbing standards.

F. SETTING FIXTURES

1. Install garbage disposal using necessary equipment to meet plumbing standards.

2. Install waste line grease inceptors using necessary equipment to meet plumbing standards.

3. Install waste back vents using necessary equipment to meet plumbing standards.

4. Install acid-proof traps using necessary equipment to meet plumbing standards.

5. Install built-in lavatories using necessary equipment to meet plumbing standards.

6. Install dishwasher using necessary equipment to meet plumbing standards.

7. Install flush valve-type water closet using necessary equipment to meet plumbing standards.

8. Install washing machine connections using necessary equipment to meet plumbing standards.

9. Install shower bath accessories using necessary equipment to meet plumbing standards.

10. Install tank-type water closet using necessary equipment to meet plumbing standards.

11. Install lavatories using necessary equipment to meet plumbing standards.

G. PERFORMING SPECIAL FEATURES

1. Repair valves using necessary equipment to meet plumbing standards.

2. Replace lavatory trap drains using necessary equipment to meet plumbing standards.

3. Removed water closet drain obstructions using necessary equipment to meet plumbing standards until 100% clear.

4. Remove main drain obstructions using necessary equipment to meet plumbing standards until 100% clear.

5. Clear lavatory drain obstruction using necessary equipment to meet plumbing standards until 100% clear.

6. Replace galvanized water line section using necessary equipment to meet plumbing standards.

7. Thaw frozen pipes using necessary equipment to meet plumbing standards according to current plumbing standards.

8. Replace water pump pressure control switches using necessary equipment to meet plumbing standards.

9. Install septic tank using necessary tools to meet plumbing standards.

H. USING EMPLOYABILITY SKILLS

1. Investigate employment information using sources of employment information to identify employment opportunities.

2. Identify job requirements using health, physical, legal, education, and other occupational information to determine the requirements of an occupation.

3. Acquire wage information using available resources to determine the approximate entry wages, general wage range, and significant fringe benefits for an occupation.

4. Identify significant non-wage job characteristics using available resources to determine shift requirements, union affiliation, apprenticeships, occupational hazards, characteristics of work environment and other significant job factors.

5. Explore employment opportunities using available resources to describe local, regional, and national employment opportunities for an occupation.

6. Analyze career ladder using available resources to describe job progression in an occupation.

H. USING EMPLOYABILITY SKILLS (continued)

7. Identify personal criteria with information about available alternatives using a decision-making situation and procedures and skills in decision-making to choose a job, further training or other alternatives.

8. Prepare a resume using personal information to apply for a job.

9. Write a letter of application using personal notes to apply/inquire about a job.

10. Complete a job application using personal notes to apply for a job.

11. Demonstrate appropriate dress using a knowledge of job requirements to comply with standards of on-the-job dress and grooming.

12. Complete a job interview using communication and interpersonal skills to become employed.

13. Describe personal criteria using references to identify acceptable job offers.

14. Demonstrate interpersonal skills to achieve successful relationships with others.

15. Identify source of continuing education for an occupation using available resources to identify career ladder alternatives.

16. Describe job termination procedures using a knowledge of the occupational area to leave a particular job.

39

Duty: Performing General Plumbing Activities	**Duty No.** A
	Task No. 1

Task: Determine plumbing requirements using code book to meet local standards.

Achievement Indicators: The learner:	Yes	No
1. Reviewed local plumbing codes -	____	____
2. Reviewed plans and specifications -	____	____
3. Amended plans and specifications to adhere to local codes -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing General Plumbing Activities	**Duty No.** A
	Task No. 2

Task: Demonstrate blueprint reading using procedures to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Obtained set of working drawings -	____	____
2. Identified abbreviations for building terms -	____	____
3. Identified American standard plumbing symbols -	____	____
4. Interpreted multiview drawings -	____	____
5. Demonstrated dimensioning methods -	____	____
6. Located center lines -	____	____
7. Identified dimensions -	____	____
8. Identified doors and windows -	____	____
9. Interpreted section drawings -	____	____
10. Identified plumbing symbols -	____	____

Criteria: Competence in the task will be recoginzed when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing General Plumbing Activities	**Duty No.** A
	Task No. 3

Task: Specify plumbing materials using plans and specifications to complete job.

Achievement Indicators:	The learner:	Yes	No
	1. Identified plumbing materials including pipe, fittings, and supplies for plastic, iron, cement, and copper plumbing materials -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing General Plumbing Activities	**Duty No.** A
	Task No. 4

Task: Compute bids using plans, specifications and current costs to submit for approval.

Achievement Indicators: The learner:	Yes	No
1. Compiled list of plumbing supplies -	____	____
2. Determined and extended costs of each item -	____	____
3. Totaled material costs -	____	____
4. Determined labor costs -	____	____
5. Determined overhead costs -	____	____
6. Determined desired profit -	____	____
7. Added all costs and profits for final bid -	____	____
8. Completed formal bidding form -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing General Plumbing Activities	**Duty No.** A
	Task No. 5

Task: Secure permits using plans and specifications to receive approvals for planned plumbing work.

Achievement Indicators: The learner:	Yes	No
1. Gathered plans and specifications -	____	____
2. Proceeded to local municipality -	____	____
3. Completed application forms -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing General Plumbing Activities	**Duty No.** A
	Task No. 6

Task: Demonstrate plumbing tools using appropriate tools to show proper use.

Achievement Indicators: The learner:	Yes	No
1. Demonstrated basic hand tools applicable to plumbing -	____	____
2. Demonstrated plumbing handtools -	____	____
3. Demonstrated power tools applicable to plumbing -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing General Plumbing Activities	**Duty No.** A
	Task No. 7

Task: Calculate building sewer slope using necessary tools and equipment to meet plumbing code requirements.

Achievement Indicators: The learner:	Yes	No
1. Determined the elevation and location of existing or proposed street sewer line -	____	____
2. Determined the elevation for the structure sewer line at its exit point in the structure based on standard slope requirements, using a builder's level or transit -	____	____
3. Staked and marked the exit point elevation at or near the structure -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 1

Task: Join pipe using arc welder and filler metal to meet plumbing code requirements.

Achievement Indicators: The learner:	Yes	No
1. Set up arc welding equipment according to polarity and amperage settings for pipe size -	____	____
2. Cut pipes to specified angle -	____	____
3. Cleaned and beveled pipe ends -	____	____
4. Attached ground clamp to pipe -	____	____
5. Tack welded the two pieces to assure a straight or specified angle connection -	____	____
6. Completed the pipe weld and removed all slag -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 2

Task: Cut copper tubing using a hacksaw to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Measured and marked piece to be cut from tubing -	____	____
2. Secured tubing in holding device -	____	____
3. Centered cutting edge of hacksaw on mark. Moved hacksaw blade back and forth slowly on mark to begin cut -	____	____
4. Cut tubing with back and forth sawing action -	____	____
5. Reamed cut ends -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**
marker tape measure hacksaw reamer	

Duty: Joining Pipes	**Duty No.** B
	Task No. 3

Task: Cut copper tubing using a tubing cutter to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Measured and marked tubing length to be cut -	____	____
2. Placed tubing cutting wheel on mark where tubing is to be cut -	____	____
3. Rotated cutter around circumference of tubing -	____	____
4. Tightened cutting wheel and repeated step 3 and often as needed to complete cut -	____	____
5. Reamed cut end to remove burrs -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**
marker measure tubing cutter/reamer	

Duty: Joining Pipes	**Duty No.** B
	Task No. 4

Task: Join copper tubing to brass pipe using various plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Cut copper tubing to length reamed cut end to be joined -	____	____
2. Slid copper tubing into adapter -	____	____
3. Soldered joints, helding tubing with pliers while soldering and until cool -	____	____
4. Screwed threaded end of brass pipe into adapter fitting and tightened -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 5

Task: Join copper tubing to copper pipe using various plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Reamed and cleaned ends to be soldered -	____	____
2. Applied flux or paste to outside of tubing and inside of coupling -	____	____
3. Slide tubing ends into coupling and supported assembly -	____	____
4. Applied heat evenly around fitting with oxyacetylene torch. When the flux or paste bubbled out around joint, removed torch flame -	____	____
5. Applied solder to joints around fitting ends. When a line of solder showed completely around joint, connection is filled with solder -	____	____
6. Cleaned flux or paste and solder residue from joint -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**
tubing cutter or hacksaw reamer oxyacetylene torch	

Duty: Joining Pipes	**Duty No.** B
	Task No. 6

Task: Join copper tubing to plastic pipe using various plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Positioned plastic pipe on a raised flat surface and cut to square with hacksaw -	____	____
2. Reamed plastic pipe end inside and out with knife -	____	____
3. Cleaned exterior pipe end and inside of female adapter with cleaner -	____	____
4. Applied cement to cleaned pipe end -	____	____
5. Inserted plastic pipe into adapter firmly again -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 7

Task: Join copper pipe to plastic pipe using sweat method and proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Cleaned copper pipe end and female adapter with emery cloth -	____	____
2. Applied flux or paste to copper pipe end and female adapter -	____	____
3. Inserted copper pipe into adapter and twisted slightly -	____	____
4. Lighted torch, adjusted to blue flame and heated areas of copper overlap until flux or paste bubbles -	____	____
5. Applied solder and allowed to cool. Removed excess solder with cloth -	____	____
6. Cleaned plastic pipe end and plastic section of female adapter with cleaner. Allowed to dry -	____	____
7. Applied cement to plastic pipe end and inside of adapter -	____	____
8. Inserted cemented pipe end into female adapter and butted firmly against adapter shoulder -	____	____
9. Twisted cemented joint ½ turn and allowed to dry -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 8

Task: Join copper tubing to steel pipe using various plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Checked copper tubing for square and burrs; cut and reamed if necessary -	____	____
2. Disassembled dielectric fitting -	____	____
3. Cleaned copper tubing end and inside of female section of copper fitting with emery cloth -	____	____
4. Applied flux to cleaned areas of tubing and fitting -	____	____
5. Inserted tubing end into female section of filling and twisted slightly -	____	____
6. Lighted torch, adjusted to blue flame and heated areas of copper overlappeduntil flux bubbles -	____	____
7. Applied solder and allowed to cool. Removed excess solder and flux with cloth -	____	____
8. Applied pipe sealant to male pipe threads -	____	____
9. Attached threaded section of fitting to the pipe and tighten -	____	____
10. Reassembled fitting ends together, using wrenches in such a manner that stress on copper solder joint is avoided -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to the supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**
tubing cutter reamer torch adjustable wrench pipe wrench	

Duty: Joining Pipes	**Duty No.** B
	Task No. 9

Task: Join copper tubing using comoressed connectors and proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Squared tubing ends and removed burrs, if needed -	____	____
2. Inserted nut and ferrule onto end of tubing -	____	____
3. Inserted tubing end into female center portion of union -	____	____
4. Positioned nut and ferrule and tightened with wrenches ferrule is compressed, forming seal -	____	____
5. Repeated steps 2, 3 and 4 for remaining side -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 10

Task: Join plastic pipe using solvent cement method and proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Checked ends of pipe for square and burrs -	____	____
2. Cleaned pipe ends and fitting sockets with cloth, if necessary -	____	____
3. Applied pipe cleaner to outside male end of pipe and inside socket fitting -	____	____
4. Applied cement to male end of pipe and inside socket of fitting brush -	____	____
5. Inserted male end of pipe full into socket while cement is still wet -	____	____
6. Repeated steps 3-5 for remaining end of fitting and second length of pipe -	____	____
7. Wiped off excess cement after joining each end -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 11

Task: Join plastic pipe to steel pipe using proper techniques and proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Applied pipe sealant to male threads of steel pipe -	____	____
2. Attached female plastic adapter to steel pipe and tightened with wrench -	____	____
3. Cleaned inside of adapter and plastic pipe end with cleaner and allowed to dry -	____	____
4. Applied plastic cement to inside of adapter and to outside of plastic pipe end -	____	____
5. Inserted plastic pipe end into adapter; pipe end should butt firmly against adapter shoulder -	____	____
6. Twisted plastic pipe ¼ turn and allowed to dry for several minutes -	____	____
7. Removed excess cement -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**
adjustable wrench pipe wrench	

Duty: Joining Pipes	**Duty No.** B
	Task No. 12

Task: Join plastic pipe to copper pipe using proper techniques and proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Positioned plastic pipe on a raised flat surface and cut to square with hacksaw -	___	___
2. Reamed plastic pipe end, inside and out w/knife -	___	___
3. Cleaned exterior pipe end (1½ to 2") and inside of the female adapter with cleaner -	___	___
4. Installed and tightened plastic fitting to copper fitting -	___	___
5. Applied cement to cleaned pipe end -	___	___
6. Inserted plastic pipe into adapter firmly against shoulder -	___	___
7. Twisted pipe ¼ turn and allowed to dry -	___	___
8. Reamed and cleaned end to be soldered -	___	___
9. Applied flux or paste to outside of pipe and inside of fitting -	___	___
10. Slide pipe end into fitting and supported properly -	___	___
11. Applied heat evenly around fitting w/torch, when flux or paste bubbles out around joint removed flame -	___	___
12. Applied solder to joints around fitting ends. When all lines of solder show completely around joint, connection is filled w/solder -	___	___
13. Cleaned flux or paste and solder residue from joint -	___	___

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 13

Task: Join pipe using no-hub couplings and proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Cut pipe ends to square, if necessary -	____	____
2. Inserted pipe ends into gasket, firmly seated against center shoulder rib -	____	____
3. Secured pipe in place -	____	____
4. Positioned stainless steel shroud to surround and cover gasket -	____	____
5. Positioned band clamps -	____	____
6. Torqued bands to 40 pounds -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 14

Task: Join plastic pipe to cast iron pipe using no-hub couplings and proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Cut pipe ends to square, if necessary -	____	____
2. Aligned pipe ends several inches apart -	____	____
3. Inserted pipe ends to center rib of no-hub gasket -	____	____
4. Positioned and adjusted stainless steel shroud to surround and cover gasket -	____	____
5. Positioned clamps on both sides of rib and tightened to desired torque -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Joining Pipes	**Duty No.** B
	Task No. 15

Task: Install pipe sleeves or thimbles using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Used a blueprint, determined thimble center location on both side of formed wall section -	____	____
2. Drew 3" circle around thimble center location on both sides of forms -	____	____
3. Cut vent pipe to length equal to wall thickness -	____	____
4. Inserted prepared vent pipe into space between wall forms and manipulated to desired location -	____	____
5. Drove in nails slightly inside and outside of circle lines to hold vent pipe in place -	____	____
6. Wrapped and tightened wire around nails and pipe for stability -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 1

Task: Install waste lines using necessary equipment to meet plumbing standards.

Achievement indicators: The learner:	Yes	No
1. Determined length of waste lines -	____	____
2. Determined minimum fall -	____	____
3. Established average grade line from end to end -	____	____
4. Laidout pipe -	____	____
5. Joined sections of pipe -	____	____
6. Tested for leaks -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**
Various plumbing tools	

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 2

Task: Install bathtubs using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Removed tub from crate, if necessary, and inspected for chips and other damages -	____	____
2. Set tub in place -	____	____
3. Installed 2" x 4" support to wall, secured tub apron on support, and level tub -	____	____
4. Connected waste and overflow, coating topside to tub waste flange with plumber's putty -	____	____
5. Connected waste and overflow to drain line provided, using slip nuts and washers -	____	____
6. Connected escutcheons and handles on faucets provided, using trim provided by manufacturer -	____	____
7. Installed diverter spout flush with finished wall, using correct length nipple -	____	____
8. Turned water on and checked for leaks on water supply and drained line connections -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 3

Task: Rough in bath tub waste line and vent using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Took measurements from rough-in specifications -	____	____
2. Laid out waste line from main line or from foundation wall to fixture -	____	____
3. Cut pipe to length -	____	____
4. Assembled pipe, leaving cleanout and vent openings as necessary -	____	____
5. Aligned and supported pipe -	____	____
6. Inserted foam cup for waste line at tub drain, if installing waste in concrete slab -	____	____
7. Ran vent line from soil pipe to revent line, or through roof -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 4

Task: Install expansion joints using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Took measurements for installation -	____	____
2. Cut and threaded pipe ends leading in and out of expansion joint, if necessary -	____	____
3. Cut and threaded three lengths of pipe which will comprise the expansion joint -	____	____
4. Applied pipe sealant to threads -	____	____
5. Installed elbow on pipe leading to expansion joint. Installed one section of expansion -	____	____
6. Continued this procedure until expansion joint is completed -	____	____
7. Connected expansion joint to pipe leading away from expansion joint -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 5

Task: Rough in lavatory waste line and vent using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Laid out waste line from main line to fixture -	___	___
2. Measured and cut piping for rough-in plumbing -	___	___
3. Assembled piping using no-hub couplings -	___	___
4. Attached 2" x 1½" sanitary tee to assembly end -	___	___
5. Joined 1½" galvanized pipe, using tapped tee for connection -	___	___
6. Aligned and supported pipe -	___	___
7. Ran vent line from soil pipe to revent line, from soil pipe to revent line, or through roof -	___	___

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 6

Task: Rough in dishwasher waste line and vent using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Laid out waste and vent lines, using rough-in specifications -	____	____
2. Cut pipe to length, as required for installation -	____	____
3. Assembled sections, including cleanout -	____	____
4. Positioned waste line from main line to floor level, leaving cleanout and vent openings -	____	____
5. Located roof position for vent pipe -	____	____
6. Cut vent pipe hole -	____	____
7. Connected vent line directly from waste line through roof -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 7

Task: Rough in floor mounted water closet waste line and vent using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Laid out waste and vent lines, using the rough in specifications -	____	____
2. Cut pipe to length, as required during installation -	____	____
3. Assembled pipe inplace, leaving cleanout and vent openings -	____	____
4. Set closet collar around waste, using caulk joint -	____	____
5. Located roof position for vent pipe -	____	____
6. Cut or formed vent pipe hole -	____	____
7. Connected vent pipe section from waste line through roof -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 8

Task: Rough in shower bath waste line and vent using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Laid out drain and vent lines, using rough-in measurments -	____	____
2. Cut pipe to length -	____	____
3. Joined P-trap and Y fitting -	____	____
4. Set the P-trap assembly and joined to main drain line -	____	____
5. Connected vent line from Y to revent -	____	____
6. Connected shower drain to P-trap -	____	____
7. Covered drain cover to protect from obstructions -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 9

Task: Rough in wall-mounted urinal waste line and vent using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Determined drain line location -	____	____
2. Laid out plumbing from main line to fixture -	____	____
3. Assembled 2" cast-iron line and combination Y and eigth bend -	____	____
4. Sat fixture line and connected to main drain -	____	____
5. Connected line from eighth bend up through slab level -	____	____
6. Connected tapped tee to open at urinal trap level -	____	____
7. Connected galvanized pipe out of tapped tee through wall -	____	____
8. Connected vent line out of tee to desired location -	____	____
9. Installed cleanout of Y if urinal mounted on exterior wall -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 10

Task: Install roof flashing using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Positioned sink to coincide with "roughed-in" piping -	____	____
2. Leveled sink -	____	____
3. Connected garbage disposal unit to sink strainer -	____	____
4. Joined adapter fitting to bottom of garbage disposal unit -	____	____
5. Installed trap to drain pipe -	____	____
6. Connected free end of adapter fitting to trap -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 11

Task: Secure pipe using hangers to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Selected pipe, positioned, and needed hanger -	____	____
2. Located hanger points on surface -	____	____
3. Prepared surface (if needed) -	____	____
4. Secured hanger of hanger section (which ever needed) to surface -	____	____
5. Attached hanger clamp portion to pipe (if needed) -	____	____
6. Hoisted pipe into position for hanger acceptance -	____	____
7. Secured pipe to hanger -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Waste Lines	**Duty No.** C
	Task No. 12

Task: Test house drain using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Inserted test plugs in each opening, except stack above highest fixture -	____	____
2. Connected water hose to water supply line and filled stack above highest fixture to within 2" of top with water -	____	____
3. Checked all plugs and caps for leaks -	____	____
4. Allowed water to stand on pipe 24 hours -	____	____
5. Checked pipe for leaks, observing sand holes in pipe, cracked fittings and leaks in joints -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 1

Task: Lay out house drains using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Acquired manufacturer's rough-in specification -	____	____
2. Identified location of fixtures -	____	____
3. Determined elevations and location of drain piping -	____	____
4. Determined type and size pipe required -	____	____
5. Determined type fittings for horizontal and vertical runs -	____	____
6. Laid out pipe system on the blueprint, indicating pipe, sizes, elevations, and type fittings -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 2

Task: Lay out trench lines using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Determined location of trench -	____	____
2. Located trench end points -	____	____
3. Determined trench width and centerline -	____	____
4. Drove two stakes (one on each side) 2" from end of trench -	____	____
5. Repeated step 4 for remaining end of trench -	____	____
6. Attached string to inside edge of one stake, stretch taut to inside edge of stake at opposite end of trench on same side, and tie securely -	____	____
7. Repeated step 6 for remaining side of trench -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 3

Task: Install drain lines in trenches using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Determined length of sewer line -	____	____
2. Determined if minimum fall from end to end is 1/8" per foot or more -	____	____
3. Established average grade line from end to end -	____	____
4. Laid out trench with nylon line and stakes -	____	____
5. Dug trench to desired depth, maintaining average grade (minimum 1/8" per foot.) -	____	____
6. Laid pipe in trench and checked each length for minimum grade -	____	____
7. Joined each section of pipe -	____	____
8. Tested for leaks -	____	____
9. Backfilled trench -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 4

Task: Backfill trenches using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Carefully placed a six-inch layer of loose dirt in trench and tamped in place -	____	____
2. Compacted backfill under and beside pipe for support -	____	____
3. Placed six-inch layers of dirt in trench and tamped, until backfill was completed -	____	____
4. Overfilled trench about 3" for settlement -	____	____

Criteria: Competence in the task will be recognized when the work is done according to code specifications, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 5

Task: Bend flexible copper tubing using a spring bender to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Inserted tubing into bender -	____	____
2. Clasped spring enclosed tubing with both hands-thumbs pointing inward one inch apart -	____	____
3. Formed bend with thumbs and hand pressure -	____	____
4. Checked bend angle -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 6

Task: Cut steel pipe using pipe cutter to meet plan requirements.

Achievement Indicators: The learner:	Yes	No
1. Secured pipe in vise, leaving approximately 6" of end to be cut protruding from the vise -	____	____
2. Measured and marked length to be cut -	____	____
3. Placed pipe cutting wheel on mark to be cut -	____	____
4. Tightened cutting wheel on pipe -	____	____
5. Made one complete revolution with pipe cutter -	____	____
6. Tighten cutting wheel, making ¼ turn with adjustment handle or knob -	____	____
7. Continued to revolve and tighten cutting wheel until cut is completed -	____	____
8. Reamed cut ends -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 7

Task: Thread steel pipe using adjustable die to meet plumbing standards.

Achievement Indicators: The learner:

	Yes	No
1. Secured pipe in vise -	____	____
2. Placed round guide end of pipe die stock on pipe end to be threaded -	____	____
3. Pressed dies against pipe end with heel of hand. Held hand against dies while taking short, clockwise strokes to begin thread-cutting operation -	____	____
4. Continued cutting threads until appropriate number of threads project from outside edge of dies. Kept stock oiled during threading process -	____	____
5. Reversed threader and removed dies from threaded end of pipe -	____	____
6. Reamed out bead in pipe end -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 8

Task: Thread steel pipe using non-adjustable die to meet plumbing standard.

Achievement Indicators: The learner:	Yes	No
1. Secured pipe in vise -	____	____
2. Placed round guide end of pipe die stock on pipe and pushed pipe threading dies against pipe with heel of hand -	____	____
3. Exerted pressure with heel of hand against pipe die stock and made several short turns in a clockwise direction to start threading action -	____	____
4. Turned handle of pipe die stock with even and steady pressure until two newly cut threads project beyond head of die. Oil pipe threading dies after every two or three downward strokes -	____	____
5. Reversed ratchet on pipe die stock. Made several short motions backward and forward with die stock to loosen burrs inside dies -	____	____
6. Turned pipe dies stock counter clockwise until pipe threading dies are free of threads -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 9

Task: Thread steel pipe using power-driven vise stand to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Inserted pipe into chuck and tightened -	____	____
2. Placed cutter on pipe and allowed handle of cutter to rest against either one or both bars as required -	____	____
3. Started machine and control cutting action of cutter through handle -	____	____
4. Reamed pipe in similiar fashion -	____	____
5. Stopped machine. Started 2 or 3 threads on pipe by hand with ratchet-type dies -	____	____
6. Started machine and cut required number of threads, keeping oil on die stock until appropriate threads were cut -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 10

Task: Braze pipe using gas torch and filler metal to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Squared ends of pipe, if necessary -	____	____
2. Beveled pipe ends to be brazed with a file -	____	____
3. Supported two section of pipe to be brazed in a level position -	____	____
4. Drew pipe ends together with a clamp and turnbuckle -	____	____
5. Lighted oxyacetylene torch and adjust flame -	____	____
6. Heated pipe ends to be joined to correct temperature -	____	____
7. Held torch in one hand brazing rod in other. Applied heat as necessary while brazing the joint. Brazed pipe until a smooth joint is made around the pipe -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 11

Task: Bend steel pipe using heavy duty pipe bending tool and oxyacetylene torch and bender to meet plan requirements.

Achievement Indicators: The learner:	Yes	No
1. Secured tool in upright position -	____	____
2. Placed pipe end into groove of bending tool -	____	____
3. Pulled bending tool lever to make required bend -	____	____
4. Checked bend angle using combination square -	____	____
5. Checked for crimps in bend -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 12

Task: Weld pipe using oxyacetylene torch and filler metal to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Prepared pipe ends to be joined -	____	____
2. Lighted torch and adjusted flame -	____	____
3. Clamped or tacked pipe -	____	____
4. Welded pipe, observed to see that each pass was smooth and even -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 13

Task: Wipe clay pipe joints using proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Positioned pipes on flat surface -	____	____
2. Slid spigot end into pipe bell -	____	____
3. Stuffed oakum between spigot and bell with yarning iron, maintaining equal clearance between exterior of the spigot and the interior of bell -	____	____
4. Filled joint cavity with tar compound-rolling approximately 1" extra material -	____	____
5. Beveled and smooth joint with hand or putty knife -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 14

Task: Cut cast iron pipe using proper plubming tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Used a blueprint and determined pipe location -	____	____
2. Measured and marked length to be cut -	____	____
3. Stretched chain on cutter and wrapped it securely around pipe at point marked previously -	____	____
4. Locked chain cutter in place -	____	____
5. Supported where necessary -	____	____
6. Checked proper sloper if necessary -	____	____
7. Made proper joint connections -	____	____
8. Cut pipe to proper length by depressing cutter handles until pipe falls apart -	____	____
9. Chipped flakes from cut ends with a hammer. This is necessary when using gasket joints -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Building Drains	**Duty No.** D
	Task No. 15

Task: Cut concrete pipe using proper plumbing tools to meet job requirements.

Achievement Indicators: The learner:	Yes	No
1. Measured and marked length to be cut -	____	____
2. Cut lightly along marked line around outside of circumference of pipe using a hammer and cold chisel -	____	____
3. Repeated step 2, striking chisel harder in order to penetrate the pipe -	____	____
4. Continued cutting around the pipe until pipe falls apart -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 1

Task: Calculate water line grades using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Checked form work length and width for square, using a 100' tape -	____	____
2. Located plumbing walls, using a blueprint -	____	____
3. Stretched nylon string at points where plumbing will be installed -	____	____
4. Reviewed established grade lines with contractor -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 2

Task: Install water lines using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Marked location of main water supplies -	____	____
2. Connected main to source -	____	____
3. Anchored and supported lines as necessary -	____	____
4. Capped end of supply lines -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 3

Task: Install water storage tanks using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:

	Yes	No
1. Sat hot water storage tank in place (elevation above the heater) -	____	____
2. Installed circulating line from bottom of storage tank to bottom of hot water heater; installed second circulating line from top of heater to top of storage tank. If necessary, installed circulating pump in return water line from bottom of tank to bottom of heater -	____	____
3. Connected cold water line to either bottom of storage tank or bottom of heater -	____	____
4. Installed hot water line to building, including a gate valve in the line -	____	____
5. Installed circulating pump in return line to bottom of heater, if a circulating line is needed -	____	____
6. Installed gate valve between pump and heater -	____	____
7. Installed gate valve on each side of circulating pump -	____	____
8. Installed tempering valve, if multipled water temperatures are needed -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 4

Task: Install cut-off valves using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Dug trench for valve, if necessary -	____	____
2. Measured and cut pipe needed for installation. Reamed pipe ends -	____	____
3. Joined valve to adapter fittings with wrenches -	____	____
4. Cleaned pipe and adapter ends to be joined with cleaner -	____	____
5. Coated inside fittings and outside pipe ends with cement -	____	____
6. Assembled pipe ends into ends of fittings. Removed excess cement -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 5

Task: Install water storage tanks using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Sat hot water storage tank in place (elevation above the heater) -	____	____
2. Installed circulating line from bottom of storage tank to bottom of hot water heater; installed second circulating line from top of heater to top of storage tank -	____	____
3. Connected cold water line to either bottom of storage tank or bottom of heater -	____	____
4. Installed hot water line to building, including a gate valve in the line -	____	____
5. Installed circulating pump in return line to bottom of heater, if a circulating line is needed -	____	____
6. Installed gate valve between pump and heater -	____	____
7. Installed gate valve on each side of circulating pump -	____	____
8. Installed tempering valve, if multipled water temperatures are needed -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 6

Task: Install lawn sprinkler system using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:

	Yes	No
1. Laid out trench lines, considering desired amount of water overlap required for complete coverage -	____	____
2. Dug trenches for water lines -	____	____
3. Laid pipe, vertical tee, and riser in trenches for each sprinkler head -	____	____
4. Installed header for sprinkler lines at main supply line, using nipples and tees -	____	____
5. Connected first sprinkler supply line to heacer. Installed a cut-off valve for supply line -	____	____
6. Installed water supply line from first sprinkler supply to point of first sprinkler head -	____	____
7. Installed vertical tee in sprinkler line -	____	____
8. Installed riser in vertical tee -	____	____
9. Installed sprinkler head on riser -	____	____
10. Followed steps 5-9 for each sprinkler line, installing gate valve in front of each line -	____	____
11. Capped end of sprinkler line -	____	____
12. Tested system for coverage -	____	____
13. Filled trenches -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 7

Task: Install pressure relief valves using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Applied pipe sealant to male threads of one pipe stub atop heater (either hot or cold as determined by local codes) -	____	____
2. Attached tee to stub and tightened with wrenches -	____	____
3. Attached nipple to top of tee, using sealant and wrenches -	____	____
4. Attached relief valve to nipple end and tightened with relief valve opening positioned for desired direction of drain-off -	____	____
5. Attached drain pipe to relief valve opening -	____	____
6. Connected piping to tee for remaining water supply as determined in Step 1 -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 8

Task: Install prefabricated air chamber using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Determined location of noise -	____	____
2. Obtained access to water supply line -	____	____
3. Determined size air chamber required for line -	____	____
4. Cut off water supply -	____	____
5. Cut line at point where chamber will be installed -	____	____
6. Installed tee in cut line -	____	____
7. Installed air chamber at most distant point of termination -	____	____
8. Turned water on and tested for water hammer -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 9

Task: Rough in bath tub supply lines using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Soldered tee on main hot and cold water lines -	____	____
2. Connected hot and cold water lined for tub and shower bath to main line tees -	____	____
3. Anchored over-rim filler valve in bath wall at proper height and depth -	____	____
4. Connected hot and cold water lined to shower-filler valve, with cold water on right facing fixture -	____	____
5. Anchored and supported tubing as necessary -	____	____
6. Soldered and anchored shower arm riser -	____	____
7. Installed shower diverter arm -	____	____
8. Capped shower riser and diverter arm lines -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 10

Task: Rough in water closet supply lines using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Marked location of water supply line on wall. Normally supply line is roughed in 6" off center of fixture -	____	____
2. Soldered tee on main water supply line, if necessary -	____	____
3. Connected fixture supply branch to main supply tee -	____	____
4. Installed air chamber on fixture supply line, if required -	____	____
5. Installed supply line out of wall at correct height from floor. Normally, tubing should protrude 6" out of wall -	____	____
6. Anchored and supported supply line as necessary -	____	____
7. Capped fixture lines -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 11

Task: Rough in water heater water lines using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Marked location of water supply line on wall -	____	____
2. Soldered tee on main supply line, if necessary -	____	____
3. Connected fixture supply branch to main supply tee -	____	____
4. Installed supply line out of wall at correct height. Normally, tubing must protrude 6" out of wall -	____	____
5. Anchored and supported supply line as necessary -	____	____
6. Capped end of fixture supply line -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to the supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 12

Task: Rough in wall-mounted urinal supply lines using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Marked location of water supply line on wall as per specifications -	____	____
2. Soldered copper tee on main water supply line, if necessary -	____	____
3. Connected water supply branch to main supply tee -	____	____
4. Ran tubing out of wall at corrected height from floor -	____	____
5. Anchored and supported supply line as necessary -	____	____
6. Capped end of fixture supply line -	____	____
7. Installed air chamber, if required-	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 13

Task: Insulate water lines using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:

	Yes	No
1. Spread split insulation and fitted over straight length of pipe, butting each length end to end -	____	____
2. Applied cement to canvas overlapped tab. Pressed both edges of insulation together and pressed canvas tab down -	____	____
3. Cut V-notch in center of elbow. Folded insulation over elbow and molded together, to fit around elbow -	____	____
4. Notched out at center of tee outlet. Split insulation and fitted around tee. Cut V-shaped piece of insulation to size needed and slide into notch at center of tee to fit around tee -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 14

Task: Rough in sink supply lines using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Marked location of water supply line on wall -	____	____
2. Soldered tee on main supply lines -	____	____
3. Connected fixture supply branches to main tees -	____	____
4. Installed supply line out of wall at correct height -	____	____
5. Anchored and supported supply line as necessary -	____	____
6. Capped end of fixture supply line -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 15

Task: Install electric water heater using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Removed top from water heater -	____	____
2. Installed relief valve from opening a top of water heater. Relief valve must be positioned according to safety regulations -.	____	____
3. Connected hot water supply line to opening designated on water heater, including a dialectric union -	____	____
4. Installed hot water line in channel provided at back of water heater -	____	____
5. Connected cold water outlet to cold water opening on water heater, including a union -	____	____
6. Installed cold water line in channel provided at back of water heater -	____	____
7. Leveled water heater -	____	____
8. Turned on hot water faucet at kitchen sink and turned on water supply -	____	____
9. Filled water heater until water flows from hot water faucet in kitchen sink -	____	____
10. Cut off hot water faucet in kitchen -	____	____
11. Checked hot and cold water supply lines for leaks -	____	____
12. Replaced top of water heater -	____	____
13. Turned on electricity -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 16

Task: Install gas water heater using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Located relief valve outlet on water heater and attached tee to stub -	____	____
2. Installed relief valve -	____	____
3. Attached 3/4" galvanized line from relief valve to location of desired overflow -	____	____
4. Installed 3/4' galvanized line from heater to hot water supply line, using nipple, elbow, and union -	____	____
5. Installed 3/4" galvanized line from heater to hot water supply line, using nipple, elbow, and union -	____	____
6. Ran vent through roof or wall, using 3" galvanized vent pipe -	____	____
7. Installed 3" roof jack to prevent leaks around pipe outlet, if vent protudes through roof -	____	____
8. Placed cap over vent pipe outlet -	____	____
9. Connected gas line heater, using pipe and fitting required -	____	____
10. Turned gas supply on and checked for leaks, used soap and water solution as leak dector -	____	____
11. Opened hot water faucet in kitchen sink -	____	____
12. Turned water supply on -	____	____
13. Filled hot water tank until water flows from hot water faucet in kitchen sink -	____	____
14. Cut off hot water faucet in kitchen -	____	____
15. Checked hot water and cold water supply lines -	____	____
16. Lighted hot water heater and adjusted burner flame -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 17

Task: Install hose bib using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Determined hose bib location -	____	____
2. Shut off water supply -	____	____
3. Installed hole at correct location -	____	____
4. Ran pipe from supply to bid location -	____	____
5. Made all connections -	____	____
6. Installed hose bib -	____	____
7. Tested for leaks -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Installing Water Lines	**Duty No.** E
	Task No. 18

Task: Water pressure test water supply system using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Capped or plugged all open water supply points in building -	____	____
2. Assembled testing apparatus similar to included diagram -	____	____
3. Connected testing apparatus at temporary water service valve -	____	____
4. Removed cap or plug from uppermost supply point-bleed air and recap -	____	____
5. Purged air from system, using pump -	____	____
6. Applied desired pressure to system, using pump -	____	____
7. Closed gate valve nearest pump and observed gauge for pressure drop -	____	____
8. Noted pressure reading and closed second gate valve, if no drop in pressure has occurred -	____	____
9. Rechecked in one hour by opening second gate valve and observed pressure drop -	____	____
10. Closed both gate valves. Removed pump, allowed system to remain pressurized 24 hours, and rechecked -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 1

Task: Install garbage disposal using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Removed sink tailpipe and loosened strainer -	____	____
2. Positioned disposal unit directly under sink drain -	____	____
3. Screwed strainer into top of unit and secured with lock nut -	____	____
4. Inserted fitting into disposal unit and attached trap with cleanout -	____	____
5. Secured both with lock nuts -	____	____
6. Inspected for leaks -	____	____
7. Called electrician for connecting power to unit -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 2

Task: Install waste line grease inceptors using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Positioned interceptor in desired floor location -	____	____
2. Applied sealant to threads of extensions and sink, and vent crossover pipes -	____	____
3. Connected extensions and crossovers; tightened with wrenches -	____	____
4. Connected crossovers to sink drain tailpipe and vent pipe using union adapters and repeating steps 2 and 3 -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 3

Task: Install waste back vents using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Determined height required for vent line -	____	____
2. Laid out piping and fittings for horizontal cross vent -	____	____
3. Assembled pipe sections -	____	____
4. Connected pipe sections from fixture drain to main vent or stack -	____	____
5. Checked grade of horizontal pipe -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 4

Task: Install acid-proof traps using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Inserted basin tailpipe into top of trap -	____	____
2. Inserted top end of floor or wall drain line into tail section of trap -	____	____
3. Secured or supported trap in place -	____	____
4. Attached fusion element to joints -	____	____
5. Supplied current for specified period -	____	____
6. Removed element and checked joint bonds -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 5

Task: Install built-in lavatories using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Located position of sink on cabinet top -	____	____
2. Placed lavatory rim in correct location on cabinet top and pencil line around rim -	____	____
3. Drilled hole on inside edge of penciled line -	____	____
4. Cut along inside penciled line, leaving cavity -	____	____
5. Coated inside edge of rim with fixture sealant -	____	____
6. Fitted lavatory into cavity -	____	____
7. Attached lavatory to rim, using clips provided -	____	____
8. Coated flange of pull-out plug with plumber's putty set plug in lavatory -	____	____
9. Coated faucet flanges with plumber's putty and connected faucets to lavatory -	____	____
10. Used correct length lavatory supplies, connected water supply line to lavatory -	____	____
11. Used P-trap and 1 1/4" x 1 1/2" slip joint nut, connected drain line to lavatory -	____	____
12. Turned water on and checked connections and faucets for leaks -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 6

Task: Install dishwasher using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Removed cover from back of dishwasher, if required -	____	____
2. Identified hot water outlet on dishwasher -	____	____
3. Made up and connected hot water line from dishwasher to hot water supply line, using copper tubing and fittings -	____	____
4. Installed cut-off valve on hot water supply line -	____	____
5. Used dishwasher sink connector, installed dishwasher drain line -	____	____
6. Replaced cover on back of dishwasher -	____	____
7. Sat dishwasher in place and leveled used leveling legs provided on dishwasher -	____	____
8. Turned water supply on and cycle machine completely -	____	____
9. Checked flow of water during cycle for obstructions and leaks -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 7

Task: Install flush valve-type water closet using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Installed closet collar, used lead and oakum joint	____	____
2. Inserted closet bolts into collar -	____	____
3. Placed wax seal over closet collar -	____	____
4. Placed closet bowl over drain outlet, inserting bolts through bowl holes provided -	____	____
5. Tighten closet bolts -	____	____
6. Used slip nut and washer, connected flush valve to bowl -	____	____
7. Used 1" chrome nipple for water line and chrome elbow provided, connected flush valve to water supply line -	____	____
8. Turned water supply on, flushed water closet, and checked operation of flush valve -	____	____
9. Adjusted flush valve as required -	____	____
10. Checked plumbing fittings for leaks -	____	____
11. Checked bowl for stability; shim, if necessary -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 8

Task: Install washing machine connections using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Sat washing machine in place -	____	____
2. Removed cold water hose provided, positioned hose strainer and connected hose to cold water outlet on washing machine -	____	____
3. Connected cold water hose to cold water faucet -	____	____
4. Removed hot water hose provided, positioned hose strainer, and connected hose to hot water outlet on washing machine -	____	____
5. Connected hot water hose to hot water faucet -	____	____
6. Installed drain hose in drain outlet. The hose should not be kinked -	____	____
7. Leveled washing machine -	____	____
8. Connected ground wire to cold water faucet -	____	____
9. Ran washer through cycle and checked for obstructions in water supply lines, severe vibrations and leaks -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 9

Task: Install shower bath accessories using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Placed small amount of plumber's putty on control valve heads and shower pipe stub -	____	____
2. Attached shower head and valve to shower pipe -	____	____
3. Slid escutcheon onto shower pipe -	____	____
4. Attached shower pipe end to roughed-in wall stub -	____	____
5. Pressed escutcheon against wall covering hole and stub -	____	____
6. Placed escutcheon over water control valves and press against wall -	____	____
7. Attached control valve handles with screwdriver -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 10

Task: Install tank-type water closet using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Removed water closet, tank, and accessories from crate and checked flush valve -	____	____
2. Placed bolts in closet bowl collar used to bolt bowl to floor -	____	____
3. Placed wax seal over closet bowl collar -	____	____
4. Placed closet bowl over drain line and bolted closet bowl to floor -	____	____
5. Connected closet tank to closet bowl, using bolts, washers and bushings provided. Tightened nuts and bolts alternately until washer exerts slight amount of pressure on bolts. Tank should be level on closet bowl -	____	____
6. Used water closet supply line, connected water supply line to closet tank -	____	____
7. Installed closet bowl seat provided by placing bolts on seat through holes on closet bowl -	____	____
8. Tighten seat nuts carefully, so as not to crack ceramic closet bowl -	____	____
9. Turned water supply on and allowed closet tank and bowl to fill -	____	____
10. Flushed water closet and made adjustments on flush valve as required -	____	____
11. Checked for leaks -	____	____
12. Placed lid on closet tank -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Setting Fixtures	**Duty No.** F
	Task No. 11

Task: Install lavatories using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Removed lavatory from crate, if necessary, and inspected for damage -	____	____
2. Determined height of installation -	____	____
3. Installed hanger at correct height -	____	____
4. Connected lavatory faucets. Used plumber's putty between seat of faucets and surface of lavatory -	____	____
5. Used nuts and washers provided by manufacturer, tighten faucets snugly on lavatory -	____	____
6. Removed flange from drain plug and coated underside with plumber's putty -	____	____
7. Dropped drain plug flange through lavatory drain hole -	____	____
8. Used material furnished by the manufacturer, tightened drain plug snuggly in lavatory -	____	____
9. Secured lavatory on hanger previously installed -	____	____
10. Used correct length lavatory piping supplies, connect cold water supply to cold water side of faucets -	____	____
11. Connected hot water supply to hot water side of faucets -	____	____
12. Used 1 1/4" P-trap and 1 1/2" x 1 1/4" slip nut and washer, installed trap to drain line provided -	____	____
13. Turned water on and checked for leaks in water supply and drained line connections -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing Special Features	**Duty No.** G
	Task No. 1

Task: Repair valves using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Shut off the water supply to faucet -	____	____
2. Turned faucet handle to open faucet -	____	____
3. Unscrewed faucet cap, used a strap wrench -	____	____
4. Removed spindle to expose washer -	____	____
5. Removed brass center screw -	____	____
6. Lifted washer with knife tip -	____	____
7. Replaced washer with new one and tighten -	____	____
8. Replaced packing washer between cap nut and spindle as follows:		
a. Removed cap nut and spindle -	____	____
b. Removed handle from top of stem -	____	____
c. Replaced packing washer -	____	____
9. Dressed faucet ground seat as follows:		
a. Inserted seating tool in faucet and pressed threaded cone down into body opening -	____	____
b. Centered spindle and cutter in faucet -	____	____
c. Used moderate downward pressure, rotated handwheel to right to dress seat -	____	____
10. Reassembled remaining parts -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing Special Features	**Duty No.** G
	Task No. 3

Task: Removed water closet drain obstructions using necessary equipment to meet plumbing standards until 100% clear.

Achievement Indicators: The learner:	Yes	No
1. Forced water through the water closet drain, using a vacuum plunger -	____	____
2. Flushed water closet -	____	____
3. If problem still existed, roded out drain with flexible cable and auger -	____	____
4. Removed auger from drain, pulling obstruction with auger -	____	____
5. Pulled water closet and removed obstruction from drain, if obstruction cannot be removed with auger -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing Special Features	**Duty No.** G
	Task No. 4

Task: Remove main drain obstructions using necessary equipment to meet plumbing standards until 100% clear.

Achievement Indicators: The learner:	Yes	No
1. Identified cleanout opening in drain line. If none existed, removed appropriate fixture -	____	____
2. Attached proper size bit on end of rod -	____	____
3. Inserted bit and rod into fixture drain line -	____	____
4. Bent rod as required to reach obstruction -	____	____
5. Activated power auger. Cleaned line, removed auger and cleaned as necessary -	____	____
6. Replaced drain line, if roots are present in drain -	____	____
7. Ran water through line -	____	____
8. Repeated process until line is cleaned -	____	____
9. Replaced fixture -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing Special Features	**Duty No.** G
	Task No. 5

Task: Clear lavatory drain obstruction using necessary equipment to meet plumbing standards until 100% clear.

Achievement Indicators: The learner:	Yes	No
1. Removed cleanout or drain stopper and checked for obstruction -	____	____
2. Plugged overflow opening with rags and forced air through drain line with vacuum plunger, if problem is not solved -	____	____
3. Rodded out drain line with flexible cable and auger, if problem is not solved -	____	____
4. Poured caustic chemical into drain, using chemical manufacturer's instructions for proper application, if limited amount of water is moving -	____	____
5. Disassembled, cleaned, and reassembled drain and P-trap, if problem still exists -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing Special Features	**Duty No.** G
	Task No. 6

Task: Replace galvanized water line section using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Turned off water supply -	____	____
2. Cut pipe at desired location, using four-wheel cutter -	____	____
3. Removed pipe to be replaced from fitting, disconnecting hangers, if necessary -	____	____
4. Assembled nipple and half union and connected to fixtures in supply line -	____	____
5. Measured, cut, and threaded replacement pipe, allowing for fittings -	____	____
6. Connected unions -	____	____
7. Turned on water supply and checked for leaks -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing Special Features	**Duty No.** G
	Task No. 7

Task: Thaw frozen pipes using necessary equipment to meet plumbing standards according to current plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Located frozen area of pipe -	____	____
2. Opened faucet or valve -	____	____
3. Lighted torch and adjusted flame -	____	____
4. Applied heat in a back and forth motion over entire length of freeze. Took precautions against fire -	____	____
5. Continued step 4 until water runs freely through lines -	____	____
6. Removed torch and extinguished flame -	____	____
7. Allowed water to flow for several minutes to avoid refreezing -	____	____
8. Closed faucet or valve -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing Special Features	**Duty No.** G
	Task No. 8

Task: Replace water pump pressure control switches using necessary equipment to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Removed cover from control switch -	____	____
2. Turned water on and checked opening and closing of switch points -	____	____
3. Replaced switch as described in following steps, if switch contacts did not disengage -	____	____
4. Turned off power supply -	____	____
5. Disconnected wiring on switch, observed carefully correct location of wire leads on switch -	____	____
6. Removed switch from pump -	____	____
7. Installed new switch on pump and connected wire leads on switch -	____	____
8. Turned on power supply and checked operation of pump -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Performing Special Features	**Duty No.** G
	Task No. 9

Task: Install a septic tank using necessary tools to meet plumbing standards.

Achievement Indicators: The learner:	Yes	No
1. Established grade at drain pipe stubbed-out of building, used a transit level -	____	____
2. Measured distance from building stub to point where drain line will enter tank. Allowed for a ¼" slope per foot of drain line -	____	____
3. Dug hole to proper depth, width, and length with back hoe. Removed dirt as necessary with shovel -	____	____
4. Lifted tank and position in hole with backhoe. Leveled tank -	____	____
5. Sat top section on tank with backhoe -	____	____
6. Covered top of tank with felt -	____	____
7. Placed dirt around and on top of tank -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed to supervisor's satisfaction, plumbing standards, or state inspection.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 1

Task: Investigate employment information using sources of employment information to identify employment opportunities.

Achievement Indicators: The learner:

	Yes	No
1. Developed a list of the prime sources of information concerning opportunities for employment -	____	____
2. Described special procedures, if any, required to utilize services, information, etc. -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 2

Task: Identify job requirements using health, physical, legal, education, and other occupational information to determine the requirements of an occupation.

Achievement Indicators: The learner:

	Yes	No
1. Listed the significant requirements (health, physical, legal, education, etc.) of the appropriate occupation -	_____	_____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 3

Task: Acquire wage information using available resources to determine the approximate entry wages, general wage range, and significant fringe benefits for an occupation.

Achievement Indicators: The learner:	Yes	No
1. Listed the approximate entry wages, general wage range, and significant fringe benefits for the appropriate occupation -	____	____
2. Compared these wages and fringe benefits with other selected occupations -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 4

Task: Identify significant non-wage job characteristics using available resources to determine shift requirements, union affiliation, apprenticeships, occupational hazards, characteristics of work environment and other significant job factors.

Achievement Indicators: The learner:

	Yes	No
1. Listed and described the significant non-wage characteristics (e.g., shift requirements, union affiliation, apprenticeships, occupational hazards, characteristics of work environment, etc.) -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 5

Task: Explore employment opportunities using available resources to describe local, regional, and national employment opportunities for an occupation.

Achievement Indicators: The learner:

	Yes	No
1. Described the local, regional, and national employment opportunities for the appropriate occupation -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 6

Task: Analyze career ladder using available resources to describe job progression in an occupation.

Achievement Indicators: The learner:	Yes	No
1. Described the career ladder associated with the appropriate occupational area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 7

Task: Identify personal criteria with information about available alternatives using a decision-making situation and procedures and skills in decision-making to choose a job, further training or other alternatives.

Achievement Indicators: The learner:	Yes	No
1. Compared personal criteria with information about a job, further training or other alternatives -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 8

Task: Prepare a resume using personal information to apply for a job.

Achievement Indicators: The learner:	Yes	No
1. Prepared a resume -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 9

Task: Write a letter of application using personal notes to apply/inquire about a job.

Achievement Indicators: The learner:

	Yes	No
1. Wrote a letter of application/inquiry -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 10

Task: Complete a job application using personal notes to apply for a job.

Achievement Indicators: The learner:

	Yes	No
1. Completed a job application -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 11

Task: Demonstrate appropriate dress using a knowledge of job requirements to comply with standards of on-the-job dress and grooming.

Achievement Indicators: The learner:

	Yes	No
1. Described and/or dressed in the attire of the appropriate occupational area, including:		
a. grooming -	____	____
b. required health and safety equipment -	____	____
c. uniforms -	____	____
d. other _____ -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 12

Task: Complete a job interview using communication and interpersonal skills to become employed.

Achievement Indicators: The learner:	Yes	No
1. Described and/or demonstrated appropriate characteristics for job applicants including:		
a. attire -	____	____
b. grooming -	____	____
c. conduct during the interview -	____	____
2. Described and/or demonstrated the interview process -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 13

Task: Describe personal criteria using references to identify acceptable job offers.

Achievement Indicators: The learner:

	Yes	No
1. Listed personal criteria (financial, social, etc.) which described a job offer -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 14

Task: Demonstrate interpersonal skills to achieve successful relationships with others.

Achievement Indicators: The learner:	Yes	No
1. Identified probable causes for conflicts and at least one possible action to relieve the conflict -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 15

Task: Identify source of continuing education for an occupation using available resources to identify career ladder alternatives.

Achievement Indicators:	The learner:	Yes	No
1.	Described the types and sources of related continuing education for the appropriate occupation and/or advancement within the career ladder associated with the occupation -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** H
	Task No. 16

Task: Describe job termination procedures using a knowledge of the occupational area to leave a particular job.

Achievement Indicators: The learner:	Yes	No
1. Described procedures and practices for terminating a job -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

STUDENT ACHIEVEMENT RECORD

PLUMBING

STUDENT _____

INSTRUCTIONS:

Mark each student's level of competence according to the following guide:

LEVEL	GUIDE
1	Student has been exposed to task
2	Task accomplished with assistance
3	Task accomplished to criteria by student
4	Ability to teach or demonstrate the task to others

TASK	LEVEL	DATE
A. PERFORMING GENERAL PLUMBING ACTIVITIES		
1. Determine plumbing requirements.		
2. Demonstrate blueprint reading.		
3. Specify plumbing materials.		
4. Compute bids.		
5. Secure permits.		
6. Demonstrate plumbing tools.		
7. Calculate building sewer slope.		
B. JOINING PIPES		
1. Join pipe.		
2. Cut copper tubing using a hacksaw.		
3. Cut copper tubing using a tubing cutter.		
4. Join copper tubing to brass pipe.		
5. Join copper tubing to copper pipe.		
6. Join copper tubing to plastic pipe.		

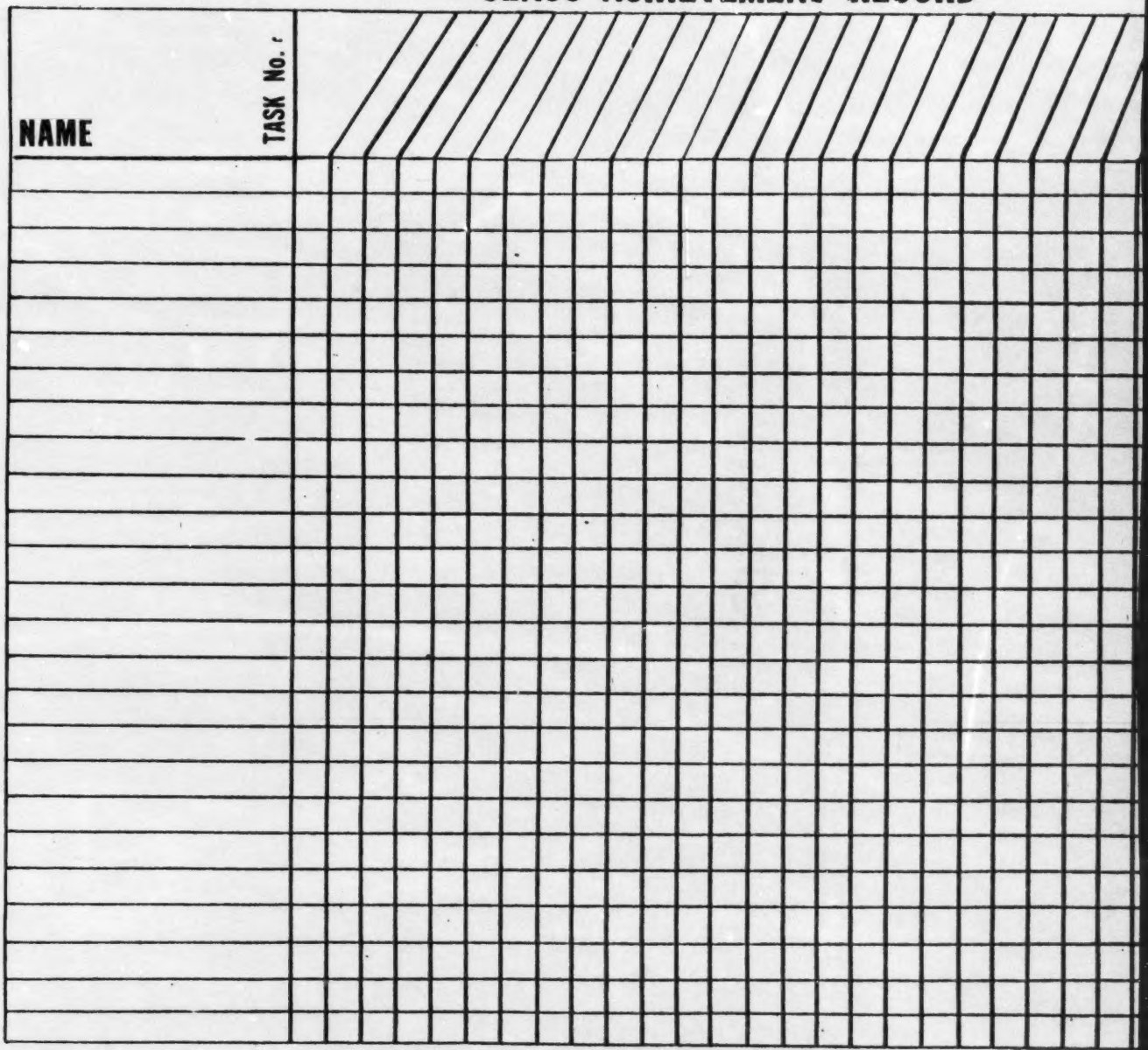
TASK	LEVEL	DATE
B. JOINING PIPES (continued)		
7. Join copper pipe to plastic pipe.		
8. Join copper tubing to steel pipe.		
9. Join copper tubing.		
10. Join plastic pipe.		
11. Join plastic pipe to steel pipe.		
12. Join plastic pipe to copper pipe.		
13. Join pipe.		
14. Join plastic pipe to cast iron pipe.		
15. Install pipe sleeves or thimbles.		
C. INSTALLING WASTE LINES		
1. Install waste lines.		
2. Install bathtubs.		
3. Rough in bath tub waste line and vent.		
4. Install expansion joints.		
5. Rough in lavatory waste line and vent.		
6. Rough in dishwasher waste line and vent.		
7. Rough in floor mounted water closet waste line and vent.		
8. Rough in shower bath waste line and vent.		
9. Rough in wall-mounted urinal waste line and vent.		
10. Install roof flashing.		
11. Secure pipe.		
12. Test house drain.		
D. BUILDING DRAINS		
1. Lay out house drains.		
2. Lay out trench lines.		
3. Install drain lines in trenches.		
4. Backfill trenches.		
5. Bend flexible copper tubing.		
6. Cut steel pipe.		
7. Thread steel pipe using adjustable die.		

TASK	LEVEL	DATE
D. BUILDING DRAINS (continued)		
8. Thread steel pipe using non-adjustable die.		
9. Thread steel pipe using power-driven vise stand.		
10. Braze pipe.		
11. Bend steel pipe.		
12. Weld pipe.		
13. Wipe clay pipe joints.		
14. Cut cast iron pipe.		
15. Cut concrete pipe.		
E. INSTALLING WATER LINES		
1. Calculate water line grades.		
2. Install water lines.		
3. Install water storage tanks.		
4. Install cut-off valves.		
5. Install water storage tanks.		
6. Install lawn sprinkler system.		
7. Install pressure relief valves.		
8. Install prefabricated air chamber.		
9. Rough in bath tub supply lines.		
10. Rough in water closet supply lines.		
11. Rough in water heater water lines.		
12. Rough in wall-mounted urinal supply lines.		
13. Insulate water lines.		
14. Rough in sink supply lines.		
15. Install electric water heater.		
16. Install gas water heater.		
17. Install hose bib.		
18. Water pressure test water supply system.		
F. SETTING FIXTURES		
1. Install garbage disposal.		
2. Install waste line grease inceptors.		

TASK	LEVEL	DATE
F. SETTING FIXTURES (continued)		
3. Install waste back vents.		
4. Install acid-proof traps.		
5. Install built-in lavatories.		
6. Install dishwasher.		
7. Install flush valve-type water closet.		
8. Install washing machine connections.		
9. Install shower bath accessories.		
10. Install tank-type water closet.		
11. Install lavatories.		
G. PERFORMING SPECIAL FEATURES		
1. Repair valves.		
2. Replace lavatory trap drains.		
3. Removed water closet drain obstructions.		
4. Remove main drain obstructions.		
5. Clear lavatory drain obstruction.		
6. Replace galvanized water line section.		
7. Thaw frozen pipes.		
8. Replace water pump pressure control switches.		
9. Install septic tank.		
H. USING EMPLOYABILITY SKILLS		
1. Ivestigate employment information.		
2. Identify job requirements.		
3. Acquire wage information.		
4. Identify significant non-wage job characteristics.		
5. Explore employment opportunities.		
6. Analyze career ladder.		
7. Identify personal criteria with information about available alternatives.		
8. Prepare a resume.		
9. Write a letter of application.		
10. Complete a job application.		

TASK	LEVEL	DATE
H. USING EMPLOYABILITY SKILLS (continued)		
11. Demonstrate appropriate dress.		
12. Complete a job interview.		
13. Describe personal criteria.		
14. Demonstrate interpersonal skills to achieve successful relationships with others.		
15. Identify source of continuing education for an occupation.		
16. Describe job termination procedures.		

CLASS ACHIEVEMENT RECORD



GLOSSARY OF VOCATIONAL TERMS

Advisory Committee. An appointed group of concerned citizens and educators representative of the occupations for which training is given in the local school, organized for the purpose of helping to plan vocational programs and offering counsel on their development and operation.

Apprenticeship. An instructional program in which the learner works directly under a qualified craft worker to learn a trade.

Career Development. A lifelong process involving a series of experiences, decisions, and interactions, which, taken cumulatively, results in the formulation of a viable self concept and provides the means through which that self concept can be implemented both vocationally and avocationally.

Career Education. The total effort of public education and the community to help all individuals become familiar with the values of a work-oriented society, to integrate such values into their personal value systems, and to implement those values into their lives in such a way that work becomes possible, meaningful, and satisfying to each individual.

Career Interest. The student's decision to pursue a job description or cluster within a vocational education program area.

Cluster of Occupations. Occupations for which a common core of instruction can prepare, as for example automotive trades which prepares for such occupations as auto mechanic, auto body repairman, automotive services, auto inspector, and brake adjuster.

Completion. That statistic which describes individuals, including early leavers who have achieved their immediate objectives in preparation for entry or progressing in an occupational field and have left the vocational education program.

Cooperative Vocational Education. An instructional plan which combines learning experiences gained through regularly scheduled supervised employment in the community and vocationally oriented in-school instruction.

Coordinator (Cooperative Education). A member of a local school staff who teaches occupational and related subject content to students preparing for employment and coordinates the efforts of all helpful agencies which can assist in a training program designed to meet the needs of learners in a cooperative vocational education program. At times the coordinator may have varying degrees of responsibility in adult vocational education.

Course. A defined segment of a program.

Course Outline. An outline of subject matter to be presented or learning experiences planned for a course.

Course of Study. A guide prepared by administrators, supervisors, and teachers of a particular school or school system as an aid to teaching a given subject or area of study. More detailed than a course outline and includes statement of methods, materials, and equipment needed.

Curriculum. A sequence of educational and skill development experiences designed to accomplish a particular purpose. The curriculum for a program of vocational/technical education is designed to prepare an individual for entry, promotion, or upgrading in a specific occupation or cluster of occupations. (See definition of Cluster of Occupations.)

Disability. An injury or illness, temporary or permanent, which prevents workers from carrying on their usual occupations. A disability retirement is retirement because of physical inability to perform the job.

Disadvantaged. Disadvantaged persons are those who have academic, socioeconomic, cultural, or other handicaps that prevent them from succeeding in a regular vocational program designed for persons without such handicaps, and who for that reason require specially-designed educational programs and related services, or both, in order for them to benefit from a vocational program.

Discharge. Dismissal of a worker from employment. The term implies discipline for unsatisfactory performance and thus is usually limited to dismissals for such reasons as insubordination, absenteeism, or inefficiency.

Discrimination. Unequal treatment of workers in hiring, employment, pay or conditions of work because of race, national origin, creed, color, sex, age, union memebership activity, or any other characteristics not related to ability or job performance. Discrimination is prohibited by Federal, State, and local laws.

Duty. A large segment of work performed by an individual. It is one of the distinct major activities involved in the work performed, and it is composed of several related tasks.

Employer. General term for any individual, corporation, or other operating group which hires workers. The term "employer" and "management" are often used interchangeably.

Evaluation. A measuring or assessing of effectiveness. An on-going process by which effectiveness and progress are determined, used to guide change and offer directions for program modification and operation.

Exploratory Experiences. Those experiences in a variety of occupations, which help the students identify job traits in relation to their abilities and characteristics, and to assist them in making realistic and appropriate occupational choices.

Follow-Up Report. Usually a composite short-term or long-term report of former students indicating their present employment status or other present commitments (education, military, homemaking). More sophisticated follow-up studies seek to assess the effectiveness of the cooperative training experience to the student's present situation. Individual follow-up information is usually maintained in a student's record file.

Follow-Up Study. A study of the occupational status and progress of former students, as a means of evaluating effectiveness of the school's program of occupational preparation, of improving such preparation, and/or of determining needs of former students for further services.

General Advisory Committee. A committee that advises an institution as to its vocational/technical education activities overall. (See also; Occupational Advisory Committee).

Guidelines. The means by which significant characteristics in the evaluation of an institution or program are identified or measured.

Handicapped. Handicapped persons are those who are mentally-retarded, hard of hearing, deaf, speech-impaired, visually-handicapped, seriously emotionally disturbed, crippled, or other health-impaired persons who, by reason of their handicapping conditions, cannot succeed in a regular vocational or consumer and homemaking education program without special educational assistance, or who require a modified vocational program.

Hazardous Occupation. An occupation designated by State of Michigan and/or federal law to be considered dangerous to the health and well-being of minors.

Individualized Instruction. That type of instruction that provides techniques through which the teacher can work directly with individual students, as opposed to group instruction.

Inservice Teacher Education. All educational, and professional activities contributing to professional competencies which a person engages in after becoming employed, such as: formal course work, work experience, internships, practicums, seminars, and independent-individualized studies.

Internship. Student performs in approved job situation. Usually paid and given credit for the work. In-school instruction usually given before the work period and seldom tied in directly with job experiences. Typically one semester or more. Internship is a term used for collegiate experiences.

Job. The duties and tasks actually performed by a specific individual.

Job Analysis. See: Occupational Analysis.

Job Description. A written statement listing the elements of a particular job or occupation. The statement may include the purpose of the job, duties, equipment used, qualifications, training requirements, physical and mental demands, and working conditions.

Job Placement. Those organized activities performed by a guidance counselor or job placement coordinator designed to assist students in locating employment.

Job Type. A group of jobs that are composed of essentially the same significant duties and tasks.

Learning Resources. All textbooks, reference materials, equipment, supplies and other items and materials needed for successful achievement of learning objectives.

Manpower. People available to perform needed labor.

Management System. A technique employed to provide an organized method of accomplishing stated mission, goals, and objectives.

Minimum Wage. The lowest rate of pay, established by law or through collective bargaining, at which covered workers may be employed. The minimum wage is usually expressed as an hourly rate.

M.O.I.S. Michigan Occupational Information System.

National Occupational Competency Exam. A written and a performance exam developed by the National Occupational Competency Testing Institute, sponsored by T&I Education, for the purpose of determining the degree of competency that one has in a specific trade and industrial occupation.

Occupational Analysis. A technique for finding out what a worker in a specific occupation does and what he needs to know to perform his job efficiently, which is then used as a means of determining the teaching content in an occupational preparatory program.

Occupational Advisory Committee. A committee advising as to a program preparing for a particular occupation or cluster of occupations.

Occupational Competence. Includes technical knowledge and skills; manipulative skills; communication skills; human relations skills; work habits; and the ability to reason, to solve problems, to think independently, and to make judgments necessary for satisfactory employment in the occupation.

Occupational Field. A group of recognized occupations having many similarities, including the following characteristics in common; the type of work performed; the basic aptitudes, and the acquired knowledge and training required; the tools, machines, instruments, and other equipment used; and the basic materials used.

Occupational Objective. An occupational goal, selected by the student, the attainment of which is the purpose for his/her vocational instruction.

On-The-Job Training. Instruction in the performance of a sequentially planned task given a student-learner by the employer during the usual working hours of the occupation. Learning experiences at the training station comprises both the application of the theory of and the technical skill aspects of the learning situation, and/or the proper character, attitude and personality development of the student-learner as general goals of the training situation at the training station.

Occupational Information. Systematically organized data used by guidance personnel and others for the purpose of helping persons make a vocational choice. Material concerns the nature of the work, duties, responsibilities, and compensations involved in the several vocations, including information about employment outlook, promotional opportunities, and entrance requirements.

Occupational Objective. A specific recognized occupational goal, selected by the student, the attainment of which is the purpose of his vocational instruction. Also called: Career Objective.

Placement Coordinator. A person who provides local leadership to plan and initiate placement services.

Placement Services or Placement Activities. A series of coordinated activities for students planning further education or seeking part-time or full-time employment either for additional education, for on-the-job training or for earning a living.

Preparatory Instruction. Instruction preparing students for full or part-time employment. Also serves to prepare students to enter and advance in an occupation. Also serves to equip workers with new or different skills demanded by technological changes.

Preparatory Program. A preparatory program provides vocational instruction designed to prepare individuals for gainful employment as semi-skilled or skilled workers or technicians or semi-professionals in recognized occupations. Preparatory programs are provided in the school laboratory/classroom.

Professional Organizations. Groups of personnel interested in and working toward the improvement, advancement, and upgrading of activities, not only in their specific field, but also of activities in related fields of endeavor such as the American Vocational Association.

Program (Vocational Education). "Vocational program" means laboratory, simulation or instruction based upon individually designed learning experiences in a vocational subject preparing the student for competencies required in a recognized occupation coded in accordance with the most recent vocational education listing of programs by the United States Department of Education.

Related Vocational Instruction. In-school courses specifically designed to improve personal and social skills, provide needed basic education (remedial), and/or develop relevant occupational skills and knowledges. The course should be regularly scheduled, should complement the learning experiences at the training station, and should be planned and developed to meet the specific needs of the individual student. The content of this course should consist of the theory of the occupational skill, the specific related information, and the general related instruction necessary to achieve personal success in the world of work.

Resources. People, money and materials available to an institution in carrying out its purposes.

School Community. The total community from which the school draws students, support, and resources.

School District. An administrative unit at the local level which exists primarily to operate public schools or to contract for public school services. Normally, taxes can be levied by such units for school purposes. These units may or may not be coterminous with county, city or town boundaries. This term is used synonymously with the term "local basic administrative unit."

Skills. The acquisition of knowledge, ability, proficiency, dexterity and technical expertness that enables one to develop a learned power of doing a thing completely.

State Plan. The document submitted by the state board for vocational education to the U. S. Office of Education describing the state's vocational education program. Includes policies followed by the state in maintaining, extending, and implementing existing programs and establishing new programs to meet the intent of the Vocational Education Acts. Prerequisite for receiving federal funds under the Acts.

Survey, Community. A fact-finding study of socioeconomic conditions and resources, community agencies, industries, business, farming, institutional practices, problems and practices of families, etc., as they exist at a given time in a given community. It is generally used by the school as a guide in revising school offerings to meet local needs.

Survey, Occupational. A form of occupational census, taken by personnel trained to determine the number of qualified employees in a designated occupation in a specified geographic or economic area; and to evaluate the need for increasing or limiting the numbers available for employment in the occupations surveyed.

Task. A unit of worker activity that is intermediate in specificity between a function and a procedural work step or action. It is a discrete unit of work performed by an individual; that is, the unit usually has a definite beginning and ending, and it is performed within a limited period of time.

Task Analysis. A detailed listing of skills necessary to perform a clearly defined, specific job, organized into a logical sequence and which may be used for teaching employment, or classification purposes.

Task Inventory. An instrument used for conducting an occupational survey. It consists of items of identification and background information and a list of appropriate duty and task statements.

Teacher-Coordinator (Cooperative Vocational Education). A member of the local school staff who teaches technical and related subject matter to students preparing for employment and coordinates classroom instruction (related classroom) with learning activities at the training station. The coordinator is also responsible for the evaluation procedures of the program.

Trade and Industrial. Instruction planned to develop basic manipulative skills, safety practices, judgments, technical knowledge, and related occupational information for the purpose of preparing persons for initial employment in the trades and industrial occupations.

Training Agreement. A statement of fundamental agreements regarding the participation of a student in a work environment. Initiated by the school, the agreement reflects a voluntary and cooperative commitment on the part of the coordinator, employer, student, and parents/guardians.

Training Plan. A format for delineating, for each student, the learning experiences and tasks to be undertaken at the training station, often paralleled with classroom units of instruction. The training plan, cooperatively determined, usually becomes a part of the training agreement.

Training Station. The establishment providing learning experience for the student-learner.

VICA. Vocational Industrial Clubs of America. The youth organization for students at secondary and post-secondary levels who are in preparation for employment in trade & industrial occupations.

Vocational Education. Organized educational programs, services, and activities which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career requiring other than a baccalaureate or advanced degree.

Vocational Student Organizations. Organizations for student-learners that complement the vocational education program. Recognized student-learner organizations for vocational education are: DECA, Distributive Education Clubs of America; FFA, Future Farmers of America; FHA-HERO, Future Homemakers of America-Home Economics Related Occupations; HOSA, Health Occupations Students of America; OEA, Office Education Association at the post-secondary level in Michigan and BOEC, Business Office Education Clubs at the secondary level; VICA, Vocational Industrial Clubs of America. Organizations for students enrolled in vocational education programs, with national, state and local units, the activities of which are an integral part of the instructional program.

Work Experience and Career Exploration (WECEP). Program emphasizes learning experiences at the training station based on individual needs and provides learning experiences for those students whose needs cannot be served by regular cooperative education programs.

Work Experience Program. Students perform tasks of the actual job and may or may not be paid. Typically engaged in for general education values, including exploratory. Usually one semester or less. Limited school supervision; usually no related class.

Work Observation Program. Student observes work, does not perform tasks except to understand them. Unpaid. Plan is usually few weeks in length and may be tied in with a class in which occupational information is discussed.

Work-Study Program. A federal program designed to provide a vocational education student with employment in the public sector and supplemental income while attending school. The vocational program does not necessarily have to be related to the job.

MICHIGAN STATE BOARD OF EDUCATION

Dr. Gumacindo Salas, President . . . . . East Lansing
John Watanen, Jr., Vice President. . . . . Marquette
Annetta Miller, Secretary. . . . . Huntington Woods
Dr. Edmund F. Vandette, Treasurer. . . . . Houghton
Carroll Hutton, NASBE Delegate . . . . . Highland
Barbara Dumouchelle. . . . . Grosse Ile
Barbara Roberts Mason. . . . . Lansing
Norman Otto Stockmeyer, Sr.. . . . . Westland

Ex-Officio Members

James J. Blanchard, Governor

Phillip E. Runkel
Superintendent of Public Instruction

The materials presented or reported herein were developed pursuant to a grant to Michigan State University, College of Agriculture and Natural Resources Education Institute (ANREI) from the Michigan State Board of Education, Vocational-Technical Education Service Area utilizing funds made available under the Federal Vocational Education Amendments of 1976 (P.L. 94-482). The opinions expressed herein do not necessarily reflect the policies and positions of the Michigan State Board of Education or the Michigan Department of Education, and no official endorsement should be inferred.

Distributed by:

Michigan Vocational Education
Resource Center
133 Erickson Hall
Michigan State University
East Lansing, Michigan 48824-1034
Phone: (517) 353-4397
Toll Free: 1-800-292-1606

Cover by: Dennis Greer, 11th Grade, VICA Member, Commercial Art Program, Crockett Vocational Technical Center, Detroit, MI.

Instructor: Mr. A. Noyer